State Energy Data System 2014
Price and Expenditure Technical Notes

Introduction to the Technical Notes

Purpose

The State Energy Data System (SEDS) was developed and is maintained and operated by the U.S. Energy Information Administration (EIA). The goal in maintaining SEDS is to create historical time series of energy production, consumption, prices, and expenditures by state that are defined as consistently as possible over time and across sectors. SEDS exists for two principal reasons: (1) to provide state energy production, consumption, price, and expenditure estimates to Members of Congress, federal and state agencies, and the general public, and (2) to provide the historical series necessary for EIA's energy models.

The report

SEDS provides annual energy price and expenditure estimates for all energy sources by major economic sectors for the 50 states and the District of Columbia and in aggregate for the United States. These data are available on the EIA website at http://www.eia.gov/state/seds/seds-data-complete.cfm. Companion tables containing state-level consumption data can also be found at the same website. In addition, tables showing state-level consumption, price, and expenditure estimates by energy source as they are updated for the most current year can be found at http://www.eia.gov/state/seds/seds-data-fuel.cfm.

Due to page-size constraints, most of the time series tables displayed as Portable Document Format (PDF) files show estimates for only selected years from 1970 through 1995; thereafter, estimates are shown consecutively through 2014. However, estimates for all years from 1970 forward are maintained in SEDS and are included in the HTML versions of the tables and in the CSV data files available via EIA's website. All years are covered by the documentation in this report.

All estimates with revisions since the last edition of SEDS that are large enough to be seen in the published tables' level of rounding are preceded with an "R" in the PDF data tables on the website.

Estimates

All prices and expenditures are in current dollars that have not been adjusted for inflation. All expenditures are consumer expenditures; that is, they represent estimates of money spent directly by consumers to purchase energy, generally including taxes. (See box on next page.)

Prices

The following sections of the Technical Notes describe how the price estimates are developed, including sources of data, methods of estimation, and conversion factors applied.

Reliable data for state-level prices rarely exist, especially as series that are consistent over a long period. Estimates and assumptions are applied to fill data gaps and to maintain consistent definitions in the data series over time. SEDS incorporates the most consistent series and procedures possible for these estimates and assumptions. However, users should recognize the limitations imposed on the system due to changing and inadequate data sources. Estimates often are based on a variety of surrogate measures that are selected on the basis of availability, applicability as indicators, continuity over time, and consistency among the various energy commodities. Original source documents for data used in SEDS (cited in this documentation) include descriptions of collection methodologies, universes, imputation or adjustment techniques (if any), and errors associated with the individual processes. Due to the numerous collection forms and procedures associated with these reports, it is not possible to develop a meaningful numerical estimate of the statistical errors of the material published in the SEDS price and expenditure tables.

It is also important to note that, even within a state, a single average price may have limited meaning in that it represents a consumption-weighted average over a whole state. For example, urban and rural electricity prices can vary significantly from a state's weighted average, and prices in one region of a state may differ from those in another because of access to less expensive hydroelectricity. Differences within a state may also be greater than differences among adjacent states. Thus, the principal value of the estimates in these tables lies in general comparisons among the states, interstate comparisons for a given year, and the analysis of trends over several years.

Estimation methodologies

Price estimates in SEDS are expressed in current dollar per million Btu (British

Taxes in the price and expenditure data

The objective in developing state energy prices is to provide estimates that include all taxes, but data sources often do not treat taxes uniformly. Where taxes are included in the source data, they are included in the price and expenditure tables. Where taxes are not included but can be separately estimated, they are added, with some exceptions listed below. In many cases, states and some localities provide tax exemptions for various kinds of activities or classes of end users. These complex exemptions are not incorporated into the state energy prices. The EIA is continuing to analyze these cases to see if a better representation can be made. A comprehensive and detailed study of taxes in EIA data is available in the report *End-Use Taxes: Current EIA Practices,* DOE/EIA-0583 (Washington, DC, August 1994). The report is available from EIA's Internet site at http://www.eia.gov/finance/reports.cfm?t=236.

The status of tax data in this year's price and expenditure tables is summarized below and described more fully in the sections for each energy source and sector.

Energy sources consumed by the end-use sectors

Coal. All steam coal and coking coal prices include taxes in all years. Appropriately, coal imports and exports in the industrial sector do not include end-user taxes.

Natural Gas. Natural gas prices are intended to include all federal, state, and local taxes, surcharges, and adjustments billed to consumers. Although the EIA data collection form states that taxes are to be included in the reported gross revenues, it is most likely that respondents would not consider sales taxes as part of their companies' gross revenues, and some may not be reporting them. As a result, consumer sales taxes may not be covered in full. For more information see *End-Use Taxes: Current EIA Practices*, page 23 of 134 in the PDF file, http://www.eia.gov/finance/reports.cfm?t=236.

Petroleum. Prices of motor gasoline, diesel fuel, and liquefied petroleum gases used for transportation include excise and other per-gallon taxes but do not include general sales taxes due to wide variation at the local level. Other liquefied petroleum gases, distillate fuel oil, kerosene, and residual fuel oil prices include sales taxes in all years. Jet fuel, aviation gasoline, asphalt and road oil, lubricants, and other petroleum products (such as petrochemical feedstocks, industrial petroleum coke, special naphthas, and waxes) do not include taxes.

Wood and Waste. Wood and waste prices for the residential, commercial, and industrial sectors include taxes.

Electricity. Taxes paid directly by the electric power sector (rather than end users) are considered operating costs and are passed on to the end users as part of the price. Sales and other use taxes are included in the prices.

Fuels consumed by the electric power sector

Coal, natural gas, petroleum coke, nuclear, and wood and waste prices include all taxes, transportation, and handling costs. There are no direct fuel costs (or taxes) for hydroelectric, geothermal, centralized solar, or wind energy. Capital, operation, and maintenance costs and related taxes associated with these energy sources are included indirectly because electricity prices reflect their presence in the rate base.

thermal unit) to facilitate comparison across energy sources. There is no adjustment for general inflation over time. If the source data are reported in physical units, they are divided by the appropriate conversion factors to create the Btu prices. Estimated prices are used only when specific state-level prices are not available for a given energy source and sector. In some cases, prices for energy consumed in one sector in a state are assigned to another sector in the same state. Specific examples are: industrial steam coal prices are assigned to the commercial and transportation sectors' steam coal use; industrial lubricants prices are assigned to transportation lubricants uses; and transportation motor gasoline prices are assigned to commercial and industrial use of motor gasoline.

In addition, there are a few cases where state-level prices could not be identified for any economic sector for a given energy source for some or all years. In these instances, a national-level price is used for all states for a given year. The procedures for estimating these national-level prices are presented in the body of the Technical Notes under each energy source as appropriate. The cases where a national-level price is assigned to all states in all years are: transportation use of aviation gasoline; industrial and transportation use of lubricants; and some components of other petroleum products used in the industrial sector.

Finally, within a given energy source and sector where price data are usually available, there are some cases of missing prices. Two general approaches are used to assign or estimate prices in cases where consumption occurs but no price is directly available from the data sources. The first approach is to assign an adjacent state price, a simple average of adjacent states' prices, or the price of the region (such as Census division, Census region, or Petroleum Administration for Defense district or subdistrict) in which the state is located. The second approach is to apply the growth rate of the price of another state, the corresponding region, or the United States to the state's previous year price, if it is available.

Three state groupings used in SEDS—U.S. Census regions and divisions, federal regions, and Petroleum Administration for Defense districts—are shown in Figures TN1, TN2, and TN3, respectively, on the following pages. States are often designated by their two-letter postal code abbreviations shown in the map legends. Throughout the Technical Notes, the term "state" includes the District of Columbia.

Expenditures

Expenditure estimates at the most detailed level of SEDS are computed by multiplying Btu consumption estimates by the corresponding price estimates. The Btu consumption estimates are adjusted to remove quantities of process fuel and intermediate products used in the industrial and transportation sectors that are not purchased directly by end users. Expenditures are expressed in million dollars. No adjustment is made for general inflation over time.

Electricity exported to Canada and Mexico are excluded from expenditure calculations. Use of hydroelectric, geothermal, wind, and solar energy sources are also removed from SEDS expenditure calculations since there are no direct fuel costs for those energy sources. SEDS consumption of wood in the residential sector and wood and waste consumption in the industrial and commercial sectors are adjusted to remove estimated quantities that were obtained at no cost.

Adjusted energy consumption estimates used to calculate expenditures are explained in detail at EIA's website: http://www.eia.gov/state/seds/sep_prices/notes/pr_consum_adjust.pdf.

Energy-consuming sectors

The five energy-consuming sectors used in the SEDS price and expenditure tables correspond to those used in the consumption tables as follows:

- **Residential sector:** An energy-consuming sector that consists of living quarters for private households. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a variety of other appliances. The residential sector excludes institutional living quarters.
- **Commercial sector:** An energy-consuming sector that consists of service-providing facilities and equipment of: businesses; federal, state, and local governments; and other private and public organizations, such as religious, social, or fraternal groups. The commercial sector includes institutional living quarters. It also includes sewage treatment facilities. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a wide variety of other equipment. *Note*: This sector includes generators that produce electricity and/or useful thermal output primarily to support the activities of the above-mentioned commercial establishments.
- **Industrial sector:** An energy-consuming sector that consists of all facilities and equipment used for producing, processing, or assembling goods. The industrial sector encompasses the following types of activity: manufacturing (NAICS codes 31-33); agriculture, forestry,

Figure TN1. U.S. Census regions and divisions

Region 1 Northeast	Region 2 Midwest		Region 3 South		Region 4 West	
Division 1 (New England)	**Division 3 (East North Central)**	**Division 4 (West North Central)**	**Division 5 (South Atlantic)**	**Division 6 (East South Central)**	**Division 8 (Mountain)**	**Division 9 (Pacific)**
Connecticut (CT)	Illinois (IL)	Iowa (IA)	Delaware(DE)	Alabama (AL)	Arizona (AZ)	Alaska (AK)
Maine (ME)	Indiana (IN)	Kansas (KS)	District of Columbia (DC)	Kentucky (KY)	Colorado (CO)	California (CA)
Massachusetts (MA)	Michigan (MI)	Minnesota (MN)	Florida (FL)	Mississippi (MS)	Idaho (ID)	Hawaii (HI)
New Hampshire (NH)	Ohio (OH)	Missouri (MO)	Georgia (GA)	Tennessee (TN)	Montana (MT)	Oregon (OR)
Rhode Island (RI)	Wisconsin (WI)	Nebraska (NE)	Maryland (MD)		Nevada (NV)	Washington (WA)
Vermont (VT)		North Dakota (ND)	North Carolina (NC)	**Division 7 (West South Central)**	New Mexico (NM)	
Division 2 (Middle Atlantic)		South Dakota (SD)	South Carolina (SC)		Utah (UT)	
			Virginia (VA)	Arkansas (AR)	Wyoming (WY)	
New Jersey (NJ)			West Virginia (WV)	Louisiana (LA)		
New York (NY)				Oklahoma (OK)		
Pennsylvania (PA)				Texas (TX)		

Figure TN2. Federal regions

Region 1
New England

Connecticut (CT)
Maine (ME)
Massachusetts (MA)
New Hampshire (NH)
Rhode Island (RI)
Vermont (VT)

Region 2
New York/New Jersey

New Jersey (NJ)
New York (NY)

Region 3
Mid Atlantic

Delaware (DE)
District of Columbia (DC)
Maryland (MD)
Pennsylvania (PA)
Virginia (VA)
West Virginia (WV)

Region 4
South Atlantic

Alabama (AL)
Florida (FL)
Georgia (GA)
Kentucky (KY)
Mississippi (MS)
North Carolina (NC)
South Carolina (SC)
Tennessee (TN)

Region 5
Midwest

Illinois (IL)
Indiana (IN)
Michigan (MI)
Minnesota (MN)
Ohio (OH)
Wisconsin (WI)

Region 6
Southwest

Arkansas (AR)
Louisiana (LA)
New Mexico (NM)
Oklahoma (OK)
Texas (TX)

Region 7
Central

Iowa (IA)
Kansas (KS)
Missouri (MO)
Nebraska (NE)

Region 8
North Central

Colorado (CO)
Montana (MT)
North Dakota (ND)
South Dakota (SD)
Utah (UT)
Wyoming (WY)

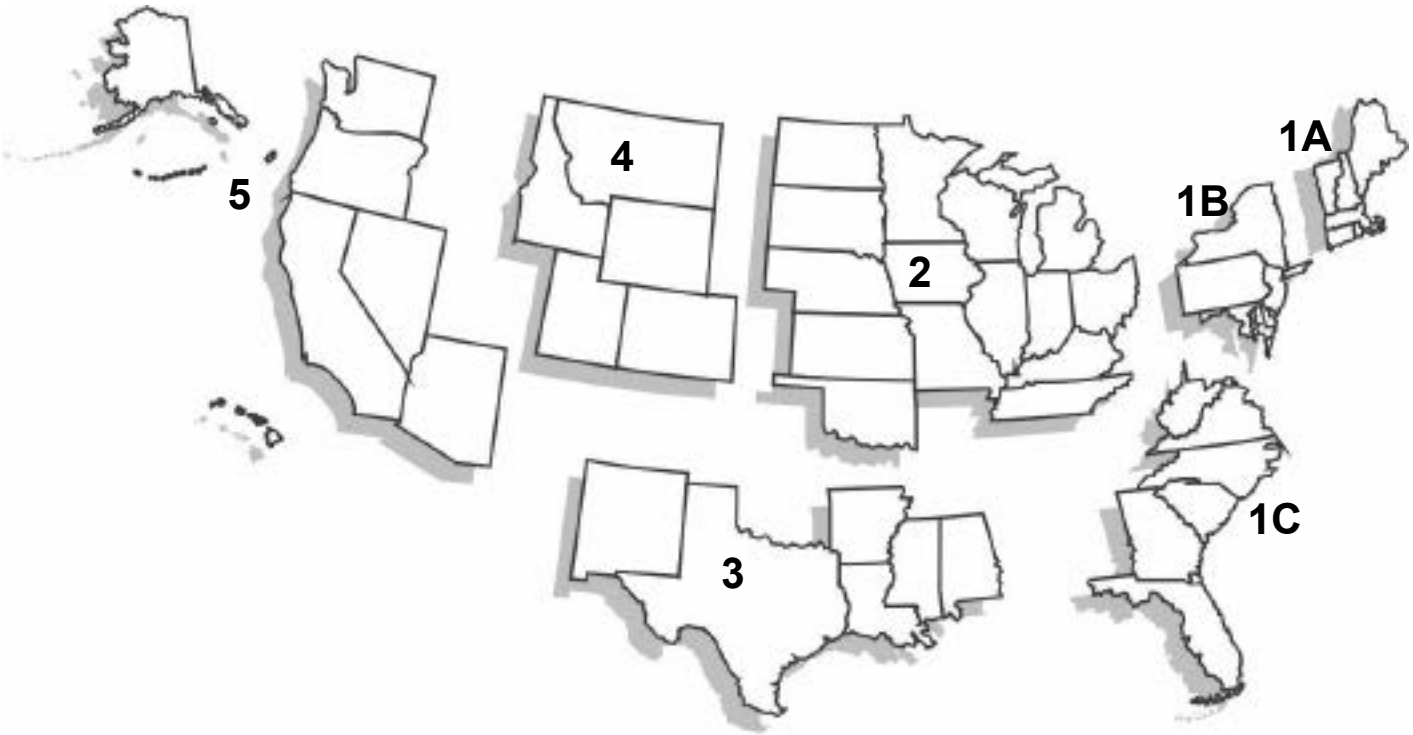
Region 9
West

Arizona (AZ)
California (CA)
Hawaii (HI)
Nevada (NV)

Region 10
Northwest

Alaska (AK)
Idaho (ID)
Oregon (OR)
Washington (WA)

Figure TN3. Petroleum Administration for Defense districts and subdistricts



Subdistrict 1A

Connecticut (CT)
Maine (ME)
Massachusetts (MA)
New Hampshire (NH)
Rhode Island (RI)
Vermont (VT)

Subdistrict 1B

Delaware (DE)
District of Columbia (DC)
Maryland (MD)
New Jersey (NJ)
New York (NY)
Pennsylvania (PA)

Subdistrict 1C

Florida (FL)
Georgia (GA)
North Carolina (NC)
South Carolina (SC)
Virginia (VA)
West Virginia (WV)

District 2

Illinois (IL)
Indiana (IN)
Iowa (IA)
Kansas (KS)
Kentucky (KY)
Michigan (MI)
Minnesota (MN)
Missouri (MO)
Nebraska (NE)
North Dakota (ND)
Ohio (OH)
Oklahoma (OK)
South Dakota (SD)
Tennessee (TN)
Wisconsin (WI)

District 3

Alabama (AL)
Arkansas (AR)
Louisiana (LA)
Mississippi (MS)
New Mexico (NM)
Texas (TX)

District 4

Colorado (CO)
Idaho (ID)
Montana (MT)
Utah (UT)
Wyoming (WY)

District 5

Alaska (AK)
Arizona (AZ)
California (CA)
Hawaii (HI)
Nevada (NV)
Oregon (OR)
Washington (WA)

fishing and hunting (NAICS code 11); mining, including oil and gas extraction (NAICS code 21); and construction (NAICS code 23). Overall energy use in this sector is largely for process heat and cooling and powering machinery, with lesser amounts used for facility heating, air conditioning, and lighting. Fossil fuels are also used as raw material inputs to manufactured products. *Note:* This sector includes generators that produce electricity and/or useful thermal output primarily to support the above-mentioned industrial activities.

- **Transportation sector:** An energy-consuming sector that consists of all vehicles whose primary purpose is transporting people and/or goods from one physical location to another. Included are automobiles; trucks; buses; motorcycles; trains, subways, and other rail vehicles; aircraft; and ships, barges, and other waterborne vehicles. Vehicles whose primary purpose is not transportation (e.g., construction cranes and bulldozers, farming vehicles, and warehouse tractors and forklifts) are classified in the sector of their primary use. In this report, natural gas used in the operation of natural gas pipelines is included in the transportation sector.
- **Electric power sector:** An energy-consuming sector that consists of electricity-only and combined-heat-and-power plants within the NAICS (North American Industry Classification System) 22 category whose primary business is to sell electricity, or electricity and heat, to the public. *Note:* This sector includes electric utilities and independent power producers.

The first four energy-consuming sectors—residential, commercial, industrial, and transportation sectors—are also called end-use sectors.

Sector definition discrepancies and other price issues

Although end-use allocations of energy consumption and expenditures follow those guidelines as closely as possible, some data are collected by using different classifications. For example, electric utilities often classify commercial and industrial users by the quantity of electricity purchases rather than by the business activity of the purchaser. Agricultural use of natural gas is collected and reported in the commercial sector through 1995 and in the industrial sector for 1996 forward. Since agricultural use of natural gas cannot be identified separately, the discrepancy cannot be reconciled. Another example is master-metered condominiums, apartments, and buildings with a combination of residential and commercial units. In many cases, billing and metering practices cause residential energy usage of electricity, natural gas, or fuel oil to be included in the commercial sector. In those cases, there is no basis for separating residential from commercial use. Readers are advised to consult the SEDS Consumption Technical Notes for specific assumptions regarding the consumption estimates.

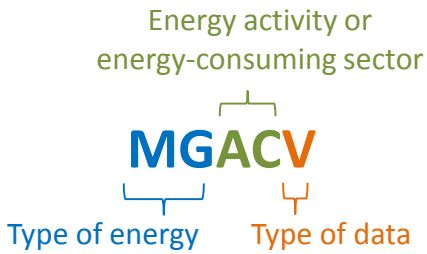
Except where specified, it is generally not possible to describe the prices in these tables as entirely "wholesale" or "retail." The prices paid in each consuming sector are usually a combination of both sets of prices, depending on a number of closely interrelated factors. Almost all residential sector prices are close to retail prices, reflecting the relatively small quantities of individual purchases and the increased costs of extensive, multilayered distribution systems. Similarly, in the transportation sector almost everyone pays the same retail-like price for motor gasoline, regardless of volume purchased or location of purchase. Conversely, residual fuel oil prices in the transportation sector are certainly more wholesale-like as a result of large deliveries to bulk facilities in major ports. In the same manner, most large industrial and many large commercial expenditures can be thought of as near wholesale, frequently involving direct access to a producer or bulk distribution facility for very large quantities. Many smaller industrial and commercial facilities pay something much closer to retail prices as a result of the small quantities involved and their institutional distance from primary suppliers. Notable exceptions to these relationships include natural gas and electricity suppliers, which typically establish fixed rates for each of several classes of service, depending on representative quantities, service factors, and distribution expenses.

Section 1. Documentation Guide

This section describes the data identification codes in the State Energy Data System (SEDS). Sections 2 through 6 provide information for each of the major energy sources: coal, natural gas, petroleum, renewable energy, and electricity. Section 7 describes adjustments for consumption of industrial process fuel and intermediate products and other uncosted energy sources that are removed in the calculation of expenditures.

Appendix A is an alphabetical listing of the variable names and formulas used in the price and expenditure module. Appendix B presents the current-dollar gross domestic product (GDP) by state used to calculate energy expenditures as percent of GDP. Appendix C provides metric and other physical conversion factors for measures used in energy analyses. Appendix D summarizes the changes in SEDS content made since the last complete release of data.

There are about 1,000 variables in SEDS. All of the variables are identified by five-character mnemonic series names, or MSN. In the following example, MGACV is the identifying code for motor gasoline expenditures in the transportation sector in million dollars.



The energy sources and products used in the price and expenditure module in SEDS, represented by the first two letters of the variable name, are:

- AR = asphalt and road oil
- AV = aviation gasoline
- CC = coal coke
- CL = coal
- DF = distillate fuel oil
- DK = distillate fuel oil, including kerosene-type jet fuel
- EL = electricity
- EM = fuel ethanol, excluding denaturant
- ES = electricity sales
- FN = petrochemical feedstocks, naphtha less than 401°F
- FO = petrochemical feedstocks, other oils equal to or greater than 401°F
- FS = petrochemical feedstocks, still gas
- JF = jet fuel
- KS = kerosene
- LG = liquefied petroleum gases
- LU = lubricants
- MG = motor gasoline
- MS = miscellaneous petroleum products
- NG = natural gas, including supplemental gaseous fuels
- NU = nuclear electric power
- P1 = asphalt and road oil, aviation gasoline, kerosene, lubricants, and other petroleum products
- PA = all petroleum products
- PC = petroleum coke
- PE = primary energy
- PO = other petroleum products
- RF = residual fuel oil
- SN = special naphtha
- TE = total energy
- WD = wood
- WW = wood and waste
- WX = waxes

It is assumed that there are no direct fuel costs for hydroelectric (HY), geothermal (GE), solar thermal and photovoltaic (SO), and wind (WY) energy. There are no price and expenditure MSNs for these energy sources.

The energy-consuming sectors, identified by characters three and four of the variable name, are:

- AC = transportation sector
- CC = commercial sector
- EG = electric power sector (generation)
- EI = electric power sector (consumption)

IC = industrial sector
RC = residential sector
TC = total consumption of all energy-consuming sectors
TX = total end-use consumption

Per capita expenditure is represented by "TP" in the third and fourth positions of the variable name.

Energy activities, mostly used in intermediate calculations, are also identified by characters three and four of the variable name. Examples are:

EX = exports
IM = imports
IS = industrial consumption, costed
OC = industrial consumption, excluding coke plants.

The fifth character of the variable name in SEDS identifies the type of data by using one of the following letters:

B = consumption in British thermal units (Btu)
D = price in dollars per million Btu
K = factor for converting data from physical units to Btu
S = share or ratio expressed as a fraction
V = expenditure in million dollars

There are a few variables that do not follow the convention:

TPOPP = resident population
GDPRV = current-dollar gross domestic product (GDP)
TEGDS = total energy expenditures as percent of current-dollar GDP

Associated with each variable name is the geographic identification. Geographic areas used in SEDS are the 50 states and the District of Columbia (represented by the U.S. Postal Service state abbreviations) and the United States as a whole. Throughout this report, the term "state" includes District of Columbia.

The geographic area codes used in SEDS are shown in Table TN1.1.

Table TN1.1. Geographic area codes used in the State Energy Data System

Code	State	Code	State
AK	Alaska	MT	Montana
AL	Alabama	NC	North Carolina
AR	Arkansas	ND	North Dakota
AZ	Arizona	NE	Nebraska
CA	California	NH	New Hampshire
CO	Colorado	NJ	New Jersey
CT	Connecticut	NM	New Mexico
DC	District of Columbia	NV	Nevada
DE	Delaware	NY	New York
FL	Florida	OH	Ohio
GA	Georgia	OK	Oklahoma
HI	Hawaii	OR	Oregon
IA	Iowa	PA	Pennsylvania
ID	Idaho	RI	Rhode Island
IL	Illinois	SC	South Carolina
IN	Indiana	SD	South Dakota
KS	Kansas	TN	Tennessee
KY	Kentucky	TX	Texas
LA	Louisiana	UT	Utah
MA	Massachusetts	VA	Virginia
MD	Maryland	VT	Vermont
ME	Maine	WA	Washington
MI	Michigan	WI	Wisconsin
MN	Minnesota	WV	West Virginia
MO	Missouri	WY	Wyoming
MS	Mississippi	US	United States

Section 2. Coal

Coal prices are developed for the following three categories: coking coal; steam coal (all noncoking coal); and coal coke imports and exports.

Coking coal, used in the industrial sector only, is a high-quality bituminous coal that is used to make coal coke. Steam coal, which may be used by all sectors, includes anthracite, bituminous coal, subbituminous coal, and lignite. In the industrial sector, coal consumption is the sum of coking coal and steam coal. The industrial coal price is the quantity-weighted average price of these two components.

Imports and exports of coal coke are available only on the national level and are accounted for in the industrial sector. Coal coke imports and exports are reported separately and are not averaged with other coal prices and expenditures.

Coking Coal

Coking coal is generally more expensive than steam coal; therefore, it is identified separately in the development of the price estimates. Coking coal prices are those paid at coke plants for coal received and include insurance, freight, and taxes.

Physical unit prices: 2005 forward

The source publication contains physical unit prices for states and Census divisions, most of which are withheld to avoid disclosure of proprietary company-level data. For 2005 forward, coking coal prices are available only for the United States, the East North Central Census Division, and, occasionally, for selected states. The East North Central price is assigned to the individual states in that division, except for the 2007 and 2014 prices for Indiana and the 2011 through 2014 prices for Ohio, which were not withheld. States in all other Census divisions are assigned a consumption-weighted price calculated using the U.S. data excluding the East North Central data.

Physical unit prices: 1970 through 2004

Source publications contain physical unit prices for states, groups of states, or Census divisions. Individual state prices are used directly for their respective states. Where individual state prices are not available, the associated group or Census division prices are assigned. Wherever individual state, group, or Census division prices are unavailable, prices are assigned from adjacent or nearby states or Census divisions or from states with similar coal use patterns as shown in Table TN2.1.

Btu prices: all years

Btu prices for states are calculated from the physical unit prices and the conversion factors for coking coal. U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from the State Energy Data System (SEDS).

Data sources

Prices

2000 forward: U.S. Energy Information Administration (EIA), *Annual Coal Report*, Table 35 (2000), Table 34 (2001 forward), http://www.eia.gov/coal/annual/.

1996 through 1999: EIA, *Coal Industry Annual 2000*, Table 96.

1981 through 1995: EIA, *Quarterly Coal Report*, October-December issue, Table A3 (1981-1991), Table 39 (1992-1994), and Table 31 (1995), http://www.eia.gov/coal/production/quarterly/.

1977 through 1980: EIA, *Coke and Coal Chemicals*, Table 19 (1977), Table 15 (1978), and Table 7 (1979, 1980).

1970 through 1976: Bureau of Mines, U.S. Department of the Interior, *Minerals Yearbook*, "Coke and Coal Chemicals" chapter, Table 22.

Consumption

1970 forward: EIA, State Energy Data System, coking coal consumption.

Conversion factors: all years

Conversion factors for all states and years can be found in the ASCII comma-delimited data file at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.

Table TN2.1. Coking coal state group price and adjacent state price assignments, 1970 through 2004

State	Years	State or division prices assigned
AL	1999, 2001–2004	East South Central
	2000	U.S.
CA	1970–1982	CA, CO, UT
CO	1970–1982	CA, CO, UT
IL	1986–1998	IN
	1999–2004	East North Central
IN	1997–2000	East North Central
KY	1970–1987	KY, MO, TN, TX
	1988–1998	OH
	1999–2004	East South Central
MD	1970, 1971	MD, NJ, NY
	1983–1991, 1993	PA
MI	1979	MI, MN, WI
	1980–1985, 1987	MI, WI
	1988–1991, 1993–1998	OH
	1999–2004	East North Central
MN	1970–1978	MN, WI
	1979	MI, MN, WI
MO	1970–1987	KY, MO, TN, TX
	1988	AL
NJ	1970, 1971	MD, NJ, NY
NY	1970, 1971	MD, NJ, NY
	1972–1982	MD, NY
	1983–1998	PA
	1999	Middle Atlantic
	2000–2004	East North Central
OH	1997–2004	East North Central
PA	1997–1999	Middle Atlantic
	2000–2004	East North Central
TN	1970–1987	KY, MO, TN, TX
	1988–1991	AL
TX	1970–1987	KY, MO, TN, TX
UT	1970–1982	CA, CO, UT
	1983–1986	TX
	1988–1998	IN
	1999–2001	East North Central
VA	1970, 1971, 1976, 1977	WV
	1978–1982	VA, WV
	1983–1986	KY
	1987–1998	OH
	1999–2004	East North Central
WI	1970–1978	MN, WI
	1979	MI, MN, WI
	1980–1985, 1987	MI, WI
WV	1978–1982	VA, WV
	1983–1986	KY
	1987–1998	OH
	1999–2004	East North Central

Steam Coal

Steam coal is used in all sectors. Price data are generally available in the electric power, residential, and industrial sectors. However, no price data are directly available in the transportation and commercial sectors, and industrial sector steam coal prices are assigned to these two sectors. Data sources and calculations for estimating coal prices are discussed by sector. Estimates of the amount of steam coal consumed by sector are taken from SEDS and are adjusted for process fuel consumption in the industrial sector. (See the discussion in Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm).

Residential sector

Residential sector steam coal price estimates are intended to represent the average prices for coal purchased by residential customers and include taxes. For 2008 forward, estimates for residential coal consumption are no longer available and are assumed to be zero.

Physical unit prices: 1979 through 2007

Residential steam coal Btu prices for 1979 forward are not available. State-level spot prices for coal paid by the electric power sector are used in a regression equation to estimate state-level residential steam coal prices for 1979 forward. The residential steam coal prices calculated for 1974 through 1978 from the American Gas Association *Gas Househeating Survey* (*GHS*) and the average Btu spot prices from the EIA *Cost and Quality of Fuels for Electric Utility Plants (C&Q)* for 1974 through 1978 are used to develop the regression equation. Electric power coal spot prices from the *C&Q* for 1979 forward are converted from cents per million Btu to dollars per million Btu.

Some states have *GHS* residential prices during the 1974 through 1978 period to use in the regression analysis, but are missing electric power sector prices in the 1979 forward data used to calculate prices. For these missing data, spot prices are assigned from other states for use in the regression, as shown in Table TN2.2. *C&Q* prices for ND and MT for some years result in a negative price when used in the regression; therefore MN spot prices are assigned to ND for use in the regression and the WY final residential sector steam coal price is assigned to MT as shown in Table TN2.2 and Table TN2.3.

Price estimates for 1974 through 1978 for some states are not available because there was no consumption. To calculate prices for 1979 forward, these states are assigned the final prices from selected states as shown in Table

Table TN2.2. Residential sector: electric power coal spot price assignments, 1979 through 2007

State	Years	State prices assigned	State	Years	State prices assigned
CO	1979, 1981	KS	NH	1974, 1975, 1981, 1983	VT
CT	1975	NY		1984, 1985	MA
	1976–1979, 2001–2007	NH	NJ	2007	NY
	1980–1987, 1993–1995, 2000	MA	NV	1975–1978, 1983–1989, 1992, 1993, 1995	CO
DC	1976–1999	MD		2006	UT
	2001–2005, 2007	VA	PA	2006, 2007	OH
DE	2006, 2007	VA	RI	1974	CT
ID	1974, 1979–1982, 1996–2005	NV		1975	VT
	1975–1977	SD		1976–1979, 2001–2007	NH
	1978	ND		1980–2000	MA
	1983–1995	CO	SD	1978, 1984	ND
	2006, 2007	UT		1979–1983, 1986, 1987, 1989,	MN
MA	1975	VT		1991–2001	
	1976–1979, 2001, 2007	NH		2005, 2007	IA
MD	2001–2007	VA	UT	1975–1978, 1980, 1983, 2000	CO
ME	1974, 1975, 1981, 1983	VT		1979	NV
	1976–1980, 1982, 1986, 1996–2007	NH	VT	1976, 1980, 2001–2007	NH
	1984, 1985	MA		1984–2000	MA
MN	2005, 2006	IA	WA	1970, 2001–2007	OR
MT	1974, 1975, 1978	ND		1974–1978, 1983–1985	CO
	1976, 1977	SD		1979–1982	NV
	1979–1982	NV	WY	1974–1976, 1978, 1982, 1985,	CO
ND	1976, 1977	SD		2005-2007	
	1979–2001	MN			

TN2.3. In addition, several states are assigned the simple average of the final prices of adjacent states as shown in Table TN2.3. Alaska residential coal prices are estimated by using a different methodology, described below.

Physical unit prices: 1971 through 1978

For 1971 through 1978, Btu steam coal prices are calculated by using data from *GHS*. The price for a state is equal to the simple average of the city/utility price observations for that state. For 1971 and 1972, *GHS* reports physical unit prices rather than Btu prices (as published for 1973 through 1978) and, therefore, the state-level conversion factors for this sector from SEDS are used to convert to Btu prices for those years. AK residential coal prices are estimated by using a different methodology, described below.

A simple average of price observations in CT, MA, ME, NH, RI, and VT is assigned to each of these states. To impute other missing prices in the 1971 through 1978 period, states are assigned simple averages of adjacent state prices or are directly assigned the single price of an adjacent or nearby state as listed in Table TN2.4.

Physical unit prices: 1970

Since state-level coal price data for 1970 are not available from either *GHS* or *C&Q*, the 1970 residential sector coal prices are calculated by using the 1971 through 1978 data from the Edison Electric Institute, *Statistical Yearbook of the Electric Utility Industry*, for the 39 states, with some reported coal use from 1971 through 1983 and regression analysis.

For estimating the 1970 prices, states missing *Statistical Yearbook* data are assigned prices as follows: ID for 1970 through 1978 from MT; MA for 1976

Table TN2.3. Residential sector coal final price assignments, 1979 through 2007

State	Years	State and averaged final prices assigned
AR	1980, 1982, 1984, 1985,	AL
	1987–1995, 1998, 2002, 2004–2007	
	1999	MO
	1981	MO, OK, TN, TX
	1983	MO, MS, OK, TN
AZ	1982, 1984, 1985	CA, NM, NV, UT
	1987, 1988, 1990–1995, 1998–2007	UT
CA	1979–1985	NV
	1987–2004	WA
	2005, 2006	UT
FL	1980–1996, 1998, 1999–2002	GA
	2003–2007	AL
LA	1980, 1982, 1984, 1986, 1988,	AL
	1991, 1993, 1995, 1997, 2000, 2007	
MS	1979, 1980, 1983, 1984, 1986–1995,	AL
	1997	
	1985	AL, AR, TN
MT	1986–2002	WY
NM	1979–2007	CO
OK	1979–1999, 2001–2007	CO
OR	1979, 1980, 1982–2000	WA
	1981	CA, ID, NV, WA
TX	1980–1982, 1985–2007	CO

through 1978 from CT; ME for 1970 through 1978 from NH; RI for 1973 and 1975 through 1978 from CT; and WA for 1970 through 1972 from OR. DC, DE, and MD are all assigned the combined *Statistical Yearbook* price for those states. Wherever individual state prices are unavailable, prices are assigned from an adjacent or nearby state as follows: CA from NV; NM from CO; OK from CO; OR from WA; and TX from CO. AK residential coal prices are estimated by using a different methodology, described as follows.

Alaska prices: all years

The AK residential coal prices for 1994 forward are estimated from an informal survey of the single coal supplier in the state. The AK residential Btu prices for 1978 through 1993 are estimated from the WA state prices during that period. To estimate the AK price for each year that AK has consumption, the average ratio of AK-to-WA prices during 1970 through 1977 is applied to the WA price.

AK physical unit prices for 1970 through 1977 are estimated by using the ratio of AK-to-U.S. electric utility sector prices.

Table TN2.4. Residential sector spot coal price assignments, 1971 through 1978

State	Years	State assigned or averaged prices
AL	1971	TN
AR	1977, 1978	AL
CA	1971, 1972, 1974, 1978	NV
DC	1971–1978	MD
DE	1971, 1972, 1974, 1976, 1977	MD
GA	1971	NC, TN
	1972	AL, NC, TN
ID	1977	MT, UT, WY
KS	1971, 1972	CO, MO
MN	1971	IA, ND, WI
	1972	IA, WI
MS	1978	AL
MT	1971	ID, ND, WY
	1972, 1973	ID, WY
ND	1972	IA, WI
	1973	MN, SD
	1974	MN, MT, SD
NE	1971, 1972	CO, IA, MO, WY
	1975	CO, IA, KS, MO, SD, WY
NJ	1971, 1972, 1974, 1977, 1978	DE, NY, PA
NM	1971	CO
NV	1971, 1972, 1975	ID, UT
	1973	ID, OR, UT
OK	1971–1978	CO
OR	1971–1978	WA
SC	1971, 1972	NC
SD	1971	IA, ND, WY
	1972	IA, WY
TX	1971–1974, 1977	CO
UT	1974, 1978	CO, ID, NV, WY
WA	1971, 1972, 1974	ID
	1977	MT, UT, WY
WV	1971, 1972	KY, MD, OH, PA, VA

Btu prices: all years

Btu prices for states are calculated from the physical unit prices and the conversion factors for steam coal. U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

1974 through 2007: EIA, *Cost and Quality of Fuels for Electric Plants*, average spot coal prices, Table 2 (1974-1979), Table 44 (1980 through 1982), Table 49 (1983, 1984), Table 39 (1985-1989), Table 8 (1990, 1991), and Table 3 (1992 through 2007), http://www.eia.gov/electricity/data/eia423/ and http://www.eia.gov/electricity/data/eia923/eia906u.html.

1994 forward: Alaska price estimated from informal discussions with Usibelli Coal Mine Co., the only coal supplier in Alaska.

1971 through 1978: American Gas Association, *Gas Househeating Survey*, table titled "Competitive Fuel Prices."

1970 through 1978: Edison Electric Institute, *Statistical Yearbook of the Electric Utility Industry*, Table 43S.

Consumption

1970 through 2007: EIA, State Energy Data System, residential sector coal consumption.

Conversion factors: 1971, 1972

Conversion factors for all states and the specific years can be found in the ASCII comma-delimited data file at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.

Commercial sector

Physical unit prices: 2008 forward

For 2008 forward, commercial coal prices state prices are taken from form EIA-3, "Quarterly Coal Consumption and Quality Report, Manufacturing and Transformation/Processing Coal Plants and Commercial and Institutional Coal Users," and are published in the EIA *Annual Coal Report*. Prices include insurance, freight, and taxes.

Prices for states in which data are withheld or unavailable are estimated by applying the ratio between the U.S. commercial steam coal price and the U.S. industrial steam coal price to the state's industrial steam coal price. For the District of Columbia, which does not have industrial steam coal price, Maryland's industrial steam coal price is used.

Table TN2.5. Commercial sector final price assignments, 1970 through 2007

State	Years	State prices assigned
CT	1980	NY
	1995–2004, 2006, 2007	MA
DC	1980–2005, 2007	MD
NH	1994, 1996–2007	MA
NJ	2007	NY
OK	1970	KS
OR	1999–2000	WA
RI	1982, 1983, 1991–2007	MA
VT	1993–1997, 2000, 2005–2007	MA

Btu prices: 2008 forward

Btu prices for states are calculated from the physical unit prices and the conversion factors for steam coal. U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Btu prices: 1970 through 2007

Commercial sector prices are assigned industrial steam coal prices. States without Btu industrial steam coal prices are assigned the prices from adjacent states, as shown in Table TN2.5. The Alaska prices for 1994 forward are estimated from an informal survey of the single coal supplier in the state. U.S. Btu prices are calculated as the average of all states' Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

2008 forward: EIA, *Annual Coal Report*, Table 34, http://www.eia.gov/coal/annual/.

1970 through 2007: Assigned industrial steam coal prices.

Consumption

1970 forward: EIA, State Energy Data System, commercial sector coal consumption.

Conversion factors: 2008 forward

Conversion factors for all states and years can be found in the ASCII comma-delimited data file at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.

Industrial sector

Industrial coal prices from 1980 forward are taken from Form EIA-3, "Quarterly Coal Consumption and Quality Report, Manufacturing and Transformation/ Processing Coal Plants and Commercial and Institutional Coal Users," and predecessor forms, which collects quarterly data on manufacturers' coal stocks, receipts, prices, and consumption. From 1980 through 1988, all manufacturers that consumed coal were required to respond to Form EIA-3. Beginning in 1989, data are collected from only those manufacturers that consumed 1,000 or more tons per year. Data prior to 1980 are based on the average cost of coal sold to manufacturing firms, which was reported on a monthly basis.

Physical unit prices: 1980 forward

For 1984 forward, state prices are published in the EIA *Annual Coal Report* and predecessor publications. Prices include insurance, freight, and taxes. Price data for 1980 through 1983 are taken directly from Form EIA-3, and predecessor forms.

Prices for states in which data are withheld or unavailable are generally estimated by using simple averages of the published data for adjacent states. In a few cases, only a single adjacent state or Census division price is published and, therefore, available for the estimation. The adjacent state and Census division price assignments used for estimations are shown in Table TN2.6. Washington prices are withheld for 1999 forward. Washington prices are historically higher than the Census division price; therefore, the average ratio of the Washington to the Pacific Division prices for 1995 through 1998 is applied to the 1999 forward Pacific Division prices to estimate the Washington prices for those years. In 2002, the price for the Pacific Division is withheld and is estimated using the average Pacific Division price from 1999 through 2001. For 2013 and 2014, price for Maryland is estimated by multiplying the U.S. price with the 2012 ratio of the Maryland price to U.S. price. Price estimates for Alaska are explained below.

For 1998 through 2000 and 2002, the prices for the New England Division are withheld and are estimated by applying the average ratio of the New England Division price to the East North Central price from 1995 through 1997 to the East North Central Division prices for those years. The New England Division prices are again withheld in 2006 and 2008 through 2011. The average ratio of the New England Division price to the East North Central price from 2003 through 2005 is computed, and applied onto the East North Central prices for 2006 and for 2008 through 2011 to derive the New England prices for those years. For 2013 and 2014, a consumption-weighted annual percent change for the New England Division is calculated using the annual percent changes for Massachusetts and Maine, which are available in the *Annual Coal Report*, and applied to the previous year's New England Division price.

Physical unit prices: 1971, 1974 through 1979

For 1971, and 1974 through 1979, available cost and quantity of bituminous coal, lignite, and anthracite from the *Annual Survey of Manufactures (ASM)* or *Census of Manufactures (CM)* are used to calculate prices as average cost per unit of sales for covered states. (States with undisclosed data are not considered covered.) Although it is not clear from the data sources, the prices probably include taxes.

For states with industrial steam coal use and for which *ASM* or *CM* data are not available in 1971 and 1974 through 1979, adjacent state simple averages of available *ASM/CM* data are used to impute prices. The assigned prices from adjacent states are shown in Table TN2.7

Physical unit prices: 1970, 1972, 1973

Steam coal industrial sector prices for 1970, 1972, and 1973 (years for which no *ASM/CM* prices are available) are estimated by using regression techniques. Values for the independent variable are steam coal electric utility sector physical unit prices, and values for the dependent variable are the steam coal industrial physical unit prices (from *ASM* or estimated, as described above) for 1971 and 1974 through 1977. A few states are assigned electric utility prices for the dependent variable in the regression, as shown in Table TN2.8 on page 21. Wherever individual state prices remain unavailable after the estimation that used the above regression techniques, prices are assigned from adjacent or nearby states, as shown in Table TN2.9 on page 21.

Physical unit prices: Alaska, all years

The Alaska steam coal industrial sector prices for 1994 and 1996 forward, are estimated from an informal survey of the single coal supplier in the state. There is no steam coal consumption reported for Alaska's industrial sector for 1995. For all other years with industrial steam coal use in Alaska (1993, and 1970 through 1977), prices are estimated by assuming that the ratio of the Alaska price to the U.S. price in the industrial sector is the same as the ratio of the Alaska and U.S. prices in the electric power sector.

Table TN2.6. Industrial sector steam coal price assignments, 1980 forward

State	Years	Prices used in the assignment	State	Years	Prices used in the assignment
AR	2010, 2012–2014	TX		2000	IA, MO, SD, WY
AZ	1980	CA, UT	NH	1980–1983	NY
	1981, 1984–1986	CA, CO, UT		1984–1993, 1995	New England
	2013, 2014	CA, CO, NV, UT	NJ	1980–1997, 2000–2006	NY, PA
CO	1980	KS, UT		1998, 1999	PA
	2000	UT, WY	NM	1980	TX, UT
	2001	KS, NE, OK, UT, WY		1981	CO, OK, TX
	2002, 2003	KS, NE, UT, WY		1982, 1983	AZ, CO, OK, TX
	2004–2007	AZ, KS, NE, OK, UT, WY		1984–1986	CO, OK, TX, UT
	2008	AZ, NE, OK, UT, WY		1987	AZ, CO, OK, TX, UT
	2009–2011	AZ, NE, UT, WY		1988–1999	AZ, CO, TX, UT
CT	1981–1994, 2005, 2006	New England		2000, 2002, 2003, 2009–2012	AZ, TX, UT
DC	1980, 1981	MD		2001, 2004–2008	AZ, OK, TX, UT
DE	1980–2003	MD		2013, 2014	TX, UT
	2004–2009	MD, PA	NV	1980, 1981, 1984–1986	CA, ID, UT
FL	1980	AL, GA		1983, 1987–1998, 2000–2011	AZ, CA, ID, UT
HI	1982, 1983, 1987–2014	CA		1999	AZ, CA, UT
ID	1999	UT, WY	NY	1998, 1999	PA
KS	2000, 2008–2014	MO	OK	1980	AR, KS, MO, TX
LA	1980–2009	AR, TX		1984–1999	AR, CO, KS, MO, TX
	2010–2014	TX		2000, 2009	AR, MO, TX
MA	1980–1983	NY		2002, 2003	AR, KS, TX
	1984–2014	New England		2010–2013	MO, TX
ME	1980–1983	NY	OR	1980, 1981, 1983–1998	CA, ID, WA
	1984–2014	New England		1982	CA, ID, NV, WA
MS	1980–2009	AL, AR, TN		2002–2014	CA, ID
	2010–2014	AL, TN	RI	1980, 1981	NY
MT	1983, 1987–1990, 1992,	ID, WY		1984–1990	New England
	2003–2011		SD	1980	IA, MN, MT
	1984–1986	ID		1981	IA, MN, MT, NE
	1991, 1993–1998, 2000–2002	ID, SD, WY		1982	IA, MN, MT, WY
	1999	SD, WY		1983, 1987–1990, 1992–1995	IA, MN, WY
ND	1980–1982	MN, MT		1984–1986	IA, MN, NE
	1983–1990, 1992, 2003,	MN		2003–2014	IA, MN, NE, WY
	2005–2014		VT	1980–1983	NY
	1991, 1993–1998, 2000–2002	MN, SD		1984–1992, 1997–1999	New England
	1999	MN, SD, WY	WV	1980	KY, MD, OH, PA, VA
NE	1980	IA, KS, MO	WY	1980	ID, MT, UT
	1982, 1983, 1987–1990, 1992	CO, IA, KS, MO, WY		1981	CO, ID, MT, NE, UT
	1991, 1993–1999	CO, IA, KS, MO, SD, WY		1984–1986	CO, ID, NE, UT

Table TN2.7. Industrial sector steam coal price assignments for 1971 and 1974 through 1979

State	Years	State prices used in the assignment	State	Years	State prices used in the assignment
AR	1971, 1974, 1975	MO, TN	NE	1979	IA, MO
	1979	MO, TN, TX	NH	1971, 1974–1979	MA
AZ	1971	CA, NV, UT	NM	1971	CO, OK, TX, UT
	1974–1978	CA, UT		1974, 1976–1978	KS, UT
CO	1974–1978	KS, NE, UT		1979	UT
	1979	UT	NV	1974	CA, OR, UT
CT	1974–1978	MA, NY		1975–1979	CA, UT
	1979	NY	OK	1974, 1975	KS, MO
DC	1971, 1974–1979	MD, VA		1976–1978	AR, KS, MO
DE	1971, 1974–1979	MD, NJ, PA		1979	MO, TX
FL	1979	AL, GA	OR	1975–1978	CA
ID	1974	OR, UT		1979	CA, WA
	1975–1978	UT	RI	1971, 1974–1978	MA
	1979	UT, WA		1979	NY
KS	1979	MO	SD	1971, 1974	IA
LA	1978	AR		1975–1978	IA, MN, NE
	1979	TX		1979	IA, MN
MA	1979	NY	TX	1974, 1975	KS
ME	1975–1978	MA		1976–1978	AR, KS
	1979	NY	VT	1971, 1974–1978	MA
MS	1971, 1974, 1975, 1979	AL, TN		1979	NY
	1976–1978	AL, AR, TN	WA	1974	CA, OR
MT	1974–1978	MN, NE, UT		1975–1978	CA
	1979	MN, UT	WY	1974–1978	NE, UT
ND	1974–1979	MN		1979	UT

Btu prices: all years

Btu prices for states are calculated from the physical unit prices and the conversion factors, which vary by state and by year. U.S. Btu prices are calculated as the average of all states' Btu prices, weighted by consumption data from SEDS, adjusted for process fuel and coking coal consumption.

Data sources

Prices

2000 forward: EIA, *Annual Coal Report*, Table 35 (2000), Table 34 (2001 forward), http://www.eia.gov/coal/annual/.

1991, 1996 through 1999: EIA, *Coal Industry Annual 2000*, Table 94.

1988, 1993 through 1995: EIA, *Coal Industry Annual 1997*, Table 94.

1987 and 1992: EIA, *Coal Industry Annual 1996*, Table 94.

1985 and 1990: EIA, *Coal Industry Annual 1994*, Table 94.

1984 and 1989: EIA, *Coal Industry Annual 1993*, Table 94.

1986: EIA, *Coal Industry Annual 1995*, Table 94.

1980 through 1983: Form EIA-3, "Quarterly Coal Consumption Report-Manufacturing Plants," Table 25 (1980), Table 11 (1981 and 1982), and Table 2 (1983).

1971, 1974 through 1979: Census Bureau, U.S. Department of Commerce, *Annual Survey of Manufactures and Census of Manufactures*, Table 4 (1971) and Table 3 (1974-1979).

Table TN2.8. Industrial sector price assignments used in the regression equation for 1971 and 1974 through 1979

State	Years	State prices assigned
AR	1973–1977	MO
CA	1970–1977	NV
CT	1975–1977	NY
DC	1976, 1977	MD
ID	1970–1977	MT
MA	1976, 1977	NH
ME	1970–1977	NH
OK	1973–1975	KS
OR	1973–1977	WA
TX	1970	NM
WA	1970–1972	OR

1970, 1972, 1973: Steam coal electric utility sector physical unit prices used in a regression equation with industrial sector prices from 1971 and 1974 through 1979.

Consumption

1970 forward: EIA, State Energy Data System, industrial (other than coke plants) coal consumption.

Conversion factors: all years

Conversion factors for all states and years can be found in the ASCII comma-delimited data file at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.

Transportation sector

Transportation use of coal accounted for 298 thousand short tons out of a total of 523,231 thousand short tons in 1970 and declined to zero after 1977. Transportation sector steam coal prices are assigned from industrial sector steam coal prices. U.S. Btu prices are calculated as the average of the state Btu prices, weighted by SEDS consumption data.

Electric power sector

Btu prices: 2002 forward

State Btu prices, including insurance, freight, and taxes, are based on unpublished cost data collected by EIA on Form EIA-923, "Power Plant Operations Report," and predecessor forms, and are converted from cents per million Btu to dollars per million Btu. Where individual state prices for the electric power sector are withheld or unavailable, coal prices for the electric utility sector are used instead. When coal prices for both the electric power sector and electric utility sectors are not available, Census division electric power sector prices are assigned as shown in Table TN2.10.

Table TN2.9. Industrial sector final price assignments for 1970, 1972, and 1973

State	Years	State prices assigned
AR	1972	MO, TN
NH	1970, 1972, 1973	MA
RI	1970, 1972, 1973	MA
SD	1970, 1972, 1973	IA
VT	1970, 1972, 1973	MA

Btu prices: 1973 through 2001

State Btu prices, including insurance, freight, and taxes, are taken from the EIA *Cost and Quality of Fuels for Electric Utility Plants* for 1973 through 2001 and are converted from cents to dollars per million Btu. Where individual state prices are withheld or unavailable, quantity-weighted Census division prices are assigned as shown in Table TN2.11. Price estimates for Alaska are explained below.

Btu prices: 1970 through 1972

Btu prices for states are taken from the Edison Electric Institute's *Statistical Yearbook* and are converted from cents to dollars. Delaware, DC, and Maryland are each assigned the combined price for the three states. The steam coal electric utility sector Alaska price for 1971 is estimated as discussed below.

Alaska prices: all years

The sources do not collect or publish prices for Alaska. The Alaska prices for 1994 forward are estimated from an informal survey of the single coal supplier in the state. Prior to that, Btu prices for Alaska are based on data from the Edison Electric Institute's *Statistical Yearbook*. For the years 1970, 1972, 1974, 1976, 1977, and 1979 through 1993, prices were taken directly from the *Statistical Yearbook*. Prices for 1971, 1973, 1975, and 1978 are estimated from the *Statistical Yearbook* prices for the United States and the average ratio of AK-to-U.S. prices for the years when AK prices are available. The 1971 and 1973 estimated prices are based on the average ratio for 1970 and 1972; the

Table TN2.10. Electric power sector price assignments, 2002 forward

State	Years	Prices assigned
AL	2002, 2005, 2008–2011	Electric utility
AR	2010–2014	Electric utility
CA	2005–2010	Electric power sector, Pacific
	2011	Electric power sector, Pacific Contiguous
	2012–2014	Electric utility, Pacific Contiguous
CO	2008, 2010	Electric utility
CT	2002, 2005–2012	Electric power sector, New England
	2013, 2014	Electric utility, New England
DE	2002, 2005–2014	Electric power sector, South Atlantic
FL	2013, 2014	Electric utility
HI	2002, 2005–2010	Electric power sector, Pacific
	2011	Electric utility, Pacific Noncontiguous
	2012–2014	Electric utility, Pacific
IN	2002, 2005–2007,	Electric utility
	2009–2014	
KY	2005–2008	Electric utility
LA	2002, 2005–2014	Electric utility
MA	2005, 2010–2012	Electric power sector, New England
	2013, 2014	Electric utility, New England
ME	2002, 2005–2012	Electric power sector, New England
	2013, 2014	Electric utility, New England
MI	2002, 2005–2014	Electric utility
MN	2005, 2008, 2009	Electric utility
MS	2002, 2005–2014	Electric utility
MT	2002, 2005–2014	Electric utility
NC	2002, 2005, 2006	Electric utility
NV	2008–2014	Electric utility
OH	2002, 2005, 2012–2014	Electric utility
OK	2002, 2005–2014	Electric utility
SC	2008–2012	Electric utility
TX	2005–2009	Electric utility
UT	2005–2011	Electric utility
VA	2011, 2012	Electric utility
WA	2002, 2005–2010	Electric power sector, Pacific
	2011	Electric power sector, Pacific Contiguous
	2012–2014	Electric utility, Pacific Contiguous
WI	2005–2009	Electric utility
WV	2007–2010	Electric utility
WY	2006–2014	Electric utility

Table TN2.11. Electric power sector price assignments, 1973 through 2001

State	Years	State/Census Division prices assigned
CA	1989–2001	Pacific
CT	1975–1979,2000, 2001	New England
DC	1976	MD, VA
HI	1990–2001	Pacific
MA	2001	New England
MD	2001	South Atlantic
ME	1990–2001	New England
OK	1973, 1974	West South Central
	1975	CO, KS, MO, NM, TX
OR	1983, 1989	Pacific
RI	1974	MA
VT	1980, 1983–1986	New England
WA	2001	Pacific

1975 price is based on the average ratio for 1974 and 1976; and the 1978 price is based on the average ratio for 1977 and 1979.

U.S. prices: all years

U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

2002 forward: Unpublished data from EIA Form EIA-923, "Power Plant Operations Report," and predecessor forms.

1994 forward: Alaska price estimated from informal discussions with Usibelli Coal Mine Co., the only coal supplier in Alaska.

2001: FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants," database, available via the EIA website at http://www.eia.gov/electricity/data/eia423/.

1973 through 2000: EIA, *Cost and Quality of Fuels for Electric Utility Plants*, http://www.eia.gov/electricity/data/eia923/eia906u.html, Table 3 (1973-1979), Table 51 (1980-1982), Table 50 (1983, 1984), Table 40 (1985-1989), Table 7 (1990, 1991), and Table 2 (1992 through 2000).

1970 through 1993: Edison Electric Institute, *Statistical Yearbook of the Electric Utility Industry*, table titled "Analysis of Fuel for Electric Generation: Total Electric Utility Industry" (1970-1988), Table 29 (1989-1993).

Consumption

1970 forward: EIA, State Energy Data System, electric power sector coal consumption.

Conversion factors: all years

Btu prices are taken directly from the data sources; no explicit conversion factors are used.

Coal Coke, Imports and Exports

Imports and exports of coal coke are components of total U.S. energy consumption and are accounted for in the industrial sector. Prices and values of imports and exports are developed only for the United States; no attempt is made to estimate state-level prices or expenditures. The quantities of U.S. coal coke imports and exports are taken from SEDS.

Physical unit prices: all years

For 1980 forward, the EIA *Coke Plant Report*, the EIA *Quarterly Coal Report*, and the U.S. Census Bureau provide physical unit coal coke import and export prices in dollars per short ton. For 1970 through 1979, *Coke and Coal Chemicals, International Coal*, and the *Minerals Yearbook* provide coal coke import and export physical unit quantities and values in short tons and dollars, respectively. Values are equivalent to expenditures.

Btu prices: all years

For 1980 forward, Btu prices are computed by dividing the physical unit prices by the conversion factor to calculate prices in dollars per million Btu. For 1970 through 1979, physical unit prices are computed by dividing the import and export values by their respective quantities, and Btu prices are computed by dividing the physical unit prices by the conversion factor.

Data sources

Prices

1989 forward: Calculated by EIA using data from the Census Bureau, U.S. Department of Commerce, "Monthly Report IM 145" and "Monthly Report EM 545."

1981 through 1988: EIA, *Quarterly Coal Report*, October-December issues, Tables A11 and A13 (1981-1985) and Tables A10 and A12 (1986-1988).

1980: EIA, *Coke Plant Report*, Tables 7 and 8.

1978 through 1979: EIA, *Coke and Coal Chemicals 1979*, Tables 5 and 6.

1977: National Coal Association, *International Coal 1980*, tables titled "U.S. Imports of Solid Fuels and Customs Value" and "U.S. Exports of Coke and Value."

1976: EIA, *Coke and Coal Chemicals*, Tables 19 and 20.

1970 through 1975: Bureau of Mines, U.S. Department of the Interior, *Minerals Yearbook*, "Coke and Coal Chemicals" chapter, Tables 19 and 20.

COAL COKE IMPORTS & EXPORTS

Consumption

1970 forward: EIA, State Energy Data System, U.S. imports and exports of coal coke.

Conversion factor: all years

24.8 million Btu per short ton.

Section 3. Natural Gas

Natural gas prices are developed for the residential, commercial, industrial, transportation, and electric power sectors. Reported natural gas prices are retail prices for sales of natural gas to ultimate users.

Natural gas prices are intended to include all federal, state, and local taxes, surcharges, and adjustments billed to consumers. Although the EIA data collection form states that taxes are to be included in the reported gross revenues, it is likely that some respondents would not consider sales taxes as part of their companies' gross revenues and may not report them. As a result, consumer sales taxes may not be covered in full. For more information see *End-Use Taxes: Current EIA Practices*, page 23, http://www.eia.gov/finance/archive/0583.pdf.

Estimates of the amount of natural gas consumed by the residential, commercial, industrial, and electric power sectors are taken from the State Energy Data System (SEDS). Estimates for the industrial sector are adjusted to remove estimated refinery consumption and lease and plant use of natural gas, and estimates for the transportation sector are adjusted to remove pipeline fuel in each state. (See the discussion in Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.)

The consumption estimates are for natural gas including supplemental gaseous fuels (SGF). SGF are introduced into or commingled with natural gas, and increase the volume available for disposition. Because SGF are mostly derived from fossil fuels, which are already accounted for, they are removed from total energy consumption in Btu (see Sections 6 and 7 of the Consumption Technical Notes) to eliminate any double counting. However, since there are no reliable data to estimate the price of SGF, total energy expenditures in Btu are not adjusted to eliminate the double counting.

Residential, commercial, and industrial sectors

Prices: 1987 forward

All natural gas physical unit prices by state for the residential, commercial, and industrial sectors are taken from data collected on the Form EIA-176, "Annual Report of Natural and Supplemental Gas Supply and Disposition." These prices are available on the U.S. Energy Information Administration's (EIA) website at http://www.eia.gov/naturalgas/data.cfm and published in the State Summaries tables of the EIA *Natural Gas Annual*.

Prices: 1970 through 1986

All natural gas physical unit prices for the residential, commercial, and industrial sectors are calculated from value and quantity of sales data from the *EIA Natural Gas Annual (NGA), Historical Natural Gas Annual (HNGA),* or its predecessor report, *Natural Gas Production and Consumption*. State prices are calculated directly from the data sources as average revenue per unit of sales by natural gas utilities. Prices for each of the three sectors are calculated by dividing the value of natural gas, reported in thousands of dollars, by the quantity of natural gas sold, as reported in million cubic feet.

For 1970 through 1979, both the value and quantity of sales data from the *HNGA* are reported as composites for Maryland and the District of Columbia, and for Maine, New Hampshire, and Vermont. In each case, the combined prices are assigned to each of the states in the composite.

Btu prices: all years

State Btu prices for all years are calculated by using the physical unit price series and the state-level average conversion factors for sectors other than electric power. U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS and adjusted for process fuel consumption in the industrial and transportation sectors.

Data sources

Prices

1997 forward: EIA, *Natural Gas Annual*, State Summaries tables, also available at http://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PRS_DMcf_a.htm, http://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PCS_DMcf_a.htm, and http://www.eia.gov/dnav/ng/ng_pri_ sum_a_EPG0_PIN_DMcf_a.htm.

1989 through 1996: Residential and Commercial—EIA website, at http://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PRS_DMcf_a.htm and http://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PCS_DMcf_a.htm. Industrial—EIA, *Historical Natural Gas Annual, 1930 Through 2000*, http://www.eia.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga.

html, Tables 31 and 32.

1987 and 1988: EIA, *Historical Natural Gas Annual, 1930 Through 2000*, http://www.eia.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga.html, Table 26 (residential), Table 28 (commercial), and Table 31 (industrial).

1980 through 1986: Calculated from quantity and value data published in the EIA *Natural Gas Annual, Volume 1*, Table 11 (1980), Table 14 (1981 through 1985), and Table 15 (1986). Comparable price data are available in the EIA *Historical Natural Gas Annual*, *1930 Through 2000,* Table 26 (residential), Table 28 (commercial), and Table 31 (industrial).

1970 through 1979: Calculated from quantity and value data published in the Bureau of Mines, U.S. Department of the Interior, *Natural Gas Production and Consumption*, Table 6 (1970 and 1979) and Table 7 (1971 through 1978). Comparable price data are available in the EIA *Historical Natural Gas Annual*, 1930 Through 2000, Table 26 (residential), Table 28 (commercial), and Table 31 (industrial).

Consumption

1970 forward: EIA, State Energy Data System, residential, commercial, and industrial natural gas consumption.

Conversion factors: all years

EIA, conversion factors published in State Energy Data System Consumption Technical Notes, Tables B4 and B5, http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.

Transportation sector

Most of the natural gas used for transportation is consumed in pipeline operations and is discussed in Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm. Data for natural gas delivered for use as vehicle fuel are available beginning in 1990. In prior years, these data are included in the commercial sector. Much of the natural gas delivered for vehicle fuel represents deliveries to fueling stations that are used primarily by fleet vehicles.

For 2013 forward, vehicle fuel prices are no longer published in the *Natural Gas Annual* They are derived by dividing vehicle fuel sales revenue by vehicle fuel sales volume extracted from the EIA Natural Gas Annual Respondent Query System and aggregated to the state level. Missing prices for states shown in Table TN3.1 are assigned the state's commercial sector prices.

Table TN3.1. Natural gas vehicle fuel price assignments from commercial sector prices, 2013 forward

State	Year
AK	2013–2014
DC	2013–2014
HI	2013–2014
ME	2013–2014
MI	2013–2014
MS	2013
NH	2013
NJ	2013
SD	2013–2014
VT	2013–2014
WV	2013–2014

For 1992 through 2012, missing vehicle fuel prices are assigned the average price of neighboring states as shown in Table TN3.2. The South Carolina price in 1998 is out of range and the price of natural gas used as vehicle fuel in Georgia for 1998 is assigned.

Data sources

Prices

2013 forward: EIA, Natural Gas Annual Respondent Query System, http://www.eia.gov/cfapps/ngqs/ngqs.cfm, "176 Custom Report (User-defined)," Vehicle Fuel Sales Revenue and Vehicle Fuel Sales Volume.

1990 through 2012: EIA, *Natural Gas Annual*, State Summaries tables, also available at http://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PDV_DMcf_a.htm. Comparable price data through 1996 are available in the *Historical Natural Gas Annual 1930 Through 2000*, http://www.eia.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga.html, Table 34.

Consumption

1990 forward: EIA, State Energy Data System, natural gas vehicle consumption.

Conversion factors: all years

EIA, conversion factors published in State Energy Data System Consumption Technical Notes, Tables B4 and B5, http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.

Table TN3.2. Natural gas vehicle fuel price assignments, 1992 through 2012

State	Year	State Prices Used
AK	1997–2012	WA
AL	2000–2005	FL, TN
	2006, 2007	FL, GA, TN
AR	2008–2011	OK, LA, MO, TN, TX
DE	1994	MD, NJ, PA
GA	1999	AL, FL, SC, TN
	2000–2005	FL, NC, SC, TN
HI	2005–2007	CA
IA	2001–2006	IL, MO, MN, WI
ID	2003–2005	MT, NV, OR, UT, WA, WY
KS	2004–2010	CO, MO, OK
KY	2004–2006	IL, IN, OH, MO, TN, VA
	2007–2012	IL, IN, MO, TN, VA
MD	2012	VA
ME	1992–2002, 2008–2012	MA
MI	2000–2006	IN, OH
	2007–2012	IN
MS	2002–2007	AR, LA, TN
	2008–2012	AL, LA, TN
NC	1996, 1997, 1999	SC, TN, VA
	1998	TN, VA
	2008	GA, SC, TN, VA
NE	1992, 1993	CO, IA, SD, WY
	1995–2000	CO, IA, KS, MO, SD, WY
	2001–2003	CO, KS, MO, WY
	2004–2006, 2008–2010	CO, MO, WY
	2007	CO, IA, MO, WY
NH	1996–2012	MA
NJ	2002	DE, NY, PA
	2007–2012	NY, PA
NM	1992, 1993, 2008	AZ, CO, OK, TX
OH	2007–2012	IN, PA
SC	1998	GA
SD	2001, 2003, 2004, 2006, 2010–2012	MN, MT, ND, WY
VT	1992–2012	MA
WV	2000–2011	MD
	2012	VA

Electric power sector

Prices: 2002 forward

All natural gas physical unit prices by state for the electric power sector are taken from the State Summaries tables of the EIA *Natural Gas Annual*. Prior to 2008, where individual state prices are unavailable, they are developed by calculating the average price of all available surrounding states. From 2008 forward, the average delivered cost of natural gas to regulated electric power plants, compiled from Schedule 2 of the EIA-923, "Power Plant Operations Report," is used to supplement missing *Natural Gas Annual* prices. If prices from both sources are not available, the average price of all available surrounding states is used. Table TN3.3 lists the states and years where price assignments are made.

Prices: 1973, 1974, 1983 through 2001

Natural gas prices by state are reported in the EIA *Cost and Quality of Fuels for Electric Plants* (*C&Q*) for gas consumed at steam-electric plants only. Btu prices are taken from the *C&Q*, and converted from cents to dollars per million Btu.

Where individual state prices are unavailable from *C&Q*, they are developed from physical unit prices published in Tables 26 through 76 of the *NGA* (from 1997 forward), or the *Historical Natural Gas Annual, 1930 Through 2000* (*HNGA*, from 1987 through 1996). Physical unit prices prior to 1987 are calculated by dividing the value of natural gas, reported in thousands of dollars, by the quantity of natural gas sold, reported in million cubic feet.

Prices are not available from either *C&Q* or the *NGA* and *HNGA* for some years. In these cases, quantity-weighted Census division prices from *C&Q* are assigned. In addition, prices for Montana in 1997, Vermont in 1986, and Washington in 1986, 1987, 1990, and 1997 use quantity-weighted Census division prices from *C&Q* for more consistent prices than those available from the *HNGA* or more consistent with values in previous and later years. Table TN3.3 lists the states and years for which *HNGA* or *C&Q* Census division prices are used.

Prices: 1980 through 1982

State-level Btu and physical unit prices for 1980 through 1982 are taken from *C&Q* for all reporting plants. Physical unit prices are taken directly from the data source, while Btu prices are converted from cents to dollars per million Btu. Where individual state prices are unavailable from *C&Q*, they are computed from value and quantity of sales data from *HNGA*.

Table TN3.3. Natural gas electric power sector price assignments, 1973 forward

State	Years	Price Source	State	Years	Price Source
AK	1973–1990	*HNGA*	NH	1973, 1974, 1987–1989	*HNGA*
	2008–2010	EIA-923 Sch 2 data		1983, 1996, 1998	*C&Q*, New England
AL	2011	EIA-923 Sch 2 data		2003, 2004	MA, ME
AR	2011, 2014	EIA-923 Sch 2 data		2005–2007	MA, VT
AZ	2011	EIA-923 Sch 2 data		2008–2014	EIA-923 Sch 2 data
CO	2012	EIA-923 Sch 2 data	NM	2003–2007	AZ, CO, OK, TX
CT	1974–1976	*HNGA*		2009–2012	EIA-923 Sch 2 data
	1973, 2000, 2001	*C&Q*, New England	NV	2013, 2014	EIA-923 Sch 2 data
	2003, 2004	MA, NY, RI	OH	2011	EIA-923 Sch 2 data
DC	2012	VA	OK	2011, 2014	EIA-923 Sch 2 data
DE	2003–2007, 2011	MD, NJ, RI	OR	1983, 1984, 1986, 1989, 1990	*C&Q*, Pacific
	2008–2010	EIA-923 Sch 2 data		2011–2014	EIA-923 Sch 2 data
	2012– 2014	NJ, PA	PA	1973	*HNGA*
IA	2008–2011	EIA-923 Sch 2 data	RI	1976, 1980	*HNGA*
ID	1983–1986	*HNGA*		1999–2001	*C&Q*, New England
	1974, 1987, 1996–2001	*C&Q*, Mountain		2014	CT, MA
	2003–2005	NV, OR, WA, WY	SC	1977	*HNGA*
	2006, 2007	NV, OR, WA		2003, 2004	GA, NC
	2008–2014	EIA-923 Sch 2 data		2005	GA
IL	2011–2014	EIA-923 Sch 2 data		2009–2014	EIA-923 Sch 2 data
IN	2011–2014	EIA-923 Sch 2 data	SD	1983–1990	HNGA
KY	2003–2005	IL, IN, OH, VA, WV		1997, 1999–2001	*C&Q*, West North Central
	2007	IL, IN, OH, VA		2005	GA
	2008–2014	EIA-923 Sch 2 data		2009, 2010	EIA-923 Sch 2 data
LA	2011	EIA-923 Sch 2 data	TN	1976, 1980, 1981, 1983, 1988–1996	*HNGA*
MD	1973, 1974, 1983–1985	*HNGA*		1997–2001	*C&Q*, East South Central
	2001	*C&Q*, South Atlantic		2003, 2004	AL, AR, GA, MS, NC, VA
	2012, 2013	PA, VA		2005–2007	AL, AR, GA, MS, VA
ME	1997–2001	*C&Q*, New England		2008	EIA-923 Sch 2 data
	2005–2014	MA	UT	1988, 1989	*HNGA*
MN	2003–2007	IA, ND, WI		2003–2005	AZ, CO, NV, WY
	2009–2014	EIA-923 Sch 2 data		2006, 2007	AZ, CO, NV
MO	2003–2007	AR, IA, IL, KS, NE, OK		2008–2011, 2014	EIA-923 Sch 2 data
	2008–2014	EIA-923 Sch 2 data	VA	2011	EIA-923 Sch 2 data
MS	2009–2014	EIA-923 Sch 2 data	VT	1983–1985, 1989, 1990	*HNGA*
MT	1997, 2006, 2007	*C&Q*, Mountain		1986	*C&Q*, New England
	2003–2005	ND, WY		2003, 2004, 2013, 2014	MA, NY
	2008–2014	EIA-923 Sch 2 data	WA	1978, 1983–1985, 1988, 1989	*HNGA*
NC	1983–1990	*HNGA*		1986, 1987, 1990, 1997, 1999–2001	*C&Q*, Pacific
	2005	GA, VA		2002	OR
	2006, 2007	GA, SC, VA		2011–2014	EIA-923 Sch 2 data
	2009–2013	EIA-923 Sch 2 data	WV	2007	OH, MD, PA, VA
ND	1973, 1974, 1976–1986	*HNGA*		2011, 2014	EIA-923 Sch 2 data
	2008, 2009, 2013	EIA-923 Sch 2 data	WY	2006, 2007	CO, NE
NE	2008–2010	EIA-923 Sch 2 data		2008–2014	EIA-923 Sch 2 data

Prices: 1973 through 1979

State-level prices are reported separately by *C&Q* for gas consumed at steam-electric plants and gas consumed at combustion turbine and internal combustion units. Weighted-average Btu prices are calculated by using the two *C&Q* prices and the respective gas deliveries for steam-electric and combustion use. Where individual state prices are unavailable from *C&Q*, they are computed from value and quantity of sales data from *HNGA*. For the New Hampshire price in 1977 a combined price is computed from value and quantity of sales data from the *HNGA* data for Maine, New Hampshire, and Vermont.

Prices: 1970 through 1972

State-level prices for 1970 through 1972 are taken from *Natural Gas Production and Consumption* and are calculated similarly to the way prices for the residential, commercial, and industrial sectors are calculated. Prices, as average revenue per unit of sales, are computed from value and quantity of sales data from the source reports. A combined price is reported for New Hampshire and Vermont for 1971 and 1972, and each of these states is assigned the combined price. State Btu prices are calculated from the physical unit prices by using the state-level electric power conversion factors.

U.S. prices: all years

U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

Primary sources:

2002 forward: EIA, *Natural Gas Annual*, State Summaries tables, also available at http://www.eia.gov/dnav/ng/ng_pri_sum_a_EPG0_PEU_DMcf_a.htm.

1973 through 2001: EIA, *Cost and Quality of Fuels for Electric Plants*, http://www.eia.gov/electricity/cost_quality/ (table numbers shown in Table TN3.4).

Secondary sources:

2008 forward: EIA Office of Electricity, Renewables, and Uranium Statistics, data on average delivered cost of natural gas to regulated electric power plants by State from EIA-923, "Power Plant Operations Report," http://www.eia.gov/electricity/data/eia923/index.html, Schedule 2.

2002 through 2007: EIA, *Cost and Quality of Fuels for Electric Power Plants*, http://www.eia.gov/electricity/cost_quality/, Table 13.

Table TN3.4. Tables from EIA *Cost and Quality of Fuels for Electric Plants* used as data sources, 1973 through 2001

Years	Price Data	Volume Data
1973, 1974	Table 10	Table 9
1975–1979	Table 10, 16	Table 9, 15
1980–1982	Table 48	–
1983, 1984	Table 53	–
1985–1987	Table 43	–
1988, 1989	Table 44	–
1990–1994	Table 12 (1994 edition)	–
1995–1996	Table 12 (1999 edition)	–
1997–2001	Table 12 (2001 edition)	–

1997 through 2001: EIA, *Natural Gas Annual*, State Summaries tables, also available at http://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm.

1990 through 1996: EIA, *Historical Natural Gas Annual 1930 Through 2000*, http://www.eia.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga.html, Table 31 and Table 32.

1980 through 1989: EIA, *Natural Gas Annual 1992, Volume 2*, Table 23.

1976 through 1979: EIA, Energy Data Reports, *Natural Gas Production and Consumption*, Table 7 (1976 through 1978) and Table 6 (1979). Comparable price data are available in the *Historical Natural Gas Annual, 1930 Through 2000*, Table 35.

1970 through 1975: Bureau of Mines, U.S. Department of the Interior, *Natural Gas Production and Consumption*, Table 6 (1970) and Table 7 (1971 through 1975). Comparable price data are available in the *Historical Natural Gas Annual, 1930 Through 2000*, Table 35.

Consumption

1970 forward: EIA, State Energy Data System, electric power sector natural gas consumption.

Conversion factors

Btu prices that are calculated directly from *Cost and Quality of Fuels for Electric Plants (C&Q)*, or from EIA-923, "Power Plant Operations Report," require no conversion factors. When *Natural Gas Annual* data are used to develop prices that are missing from *C&Q*, conversion factors are used from the following source:

1970 forward: EIA, State Energy Data System Consumption Technical Notes, Tables B2 and B3, http://www.eia.gov/state/seds/seds-technical-notes-

complete.cfm.

Section 4. Petroleum

Petroleum Overview

The 25 petroleum products included in the State Energy Data System (SEDS) are explained in this section. For 10 of these products, the method of estimating their prices by state is described in individual sections. The 10 petroleum products are:

- Asphalt and road oil (AR)
- Aviation gasoline (AV)
- Distillate fuel oil (DF)
- Jet fuel (JF)
- Kerosene (KS)
- Liquefied petroleum gases (LG)
- Lubricants (LU)
- Motor gasoline (MG)
- Petroleum coke (PC)
- Residual fuel oil (RF)

Fifteen separate products, plus petroleum coke, are included in the category called "other petroleum products" (PO). Of the 15 products, prices are developed for 6 products. All of these products are used in the industrial sector:

- Miscellaneous products
- Petrochemical feedstocks, naphtha
- Petrochemical feedstocks, other oils
- Petrochemical feedstocks, still gas (1970–1985)
- Special naphthas
- Waxes

Price estimates for petroleum coke are discussed in the petroleum coke section.

Expenditures for each petroleum product are calculated by multiplying the price estimates by the SEDS consumption estimates. The consumption estimates are adjusted to remove intermediate petroleum products. (See Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.) Estimates of average prices and total expenditures for total petroleum are also computed. Total petroleum expenditures are the sum of the expenditures of the 16 petroleum products, and average prices for total petroleum are calculated by dividing total expenditures by the sum of the adjusted consumption of the 16 petroleum products.

Asphalt and Road Oil

The State Energy Data System (SEDS) assumes that all asphalt and road oil consumption occurs in the industrial sector. Asphalt and road oil are used primarily for road construction. Other uses include waterproofing products such as roofing and sealing. The prices captured in SEDS are prices of asphalt binder or asphalt cement used in road construction. Taxes are not included in the prices because most street and highway paving is done under contract to state, county, and other public authorities who are typically exempt from paying taxes.

Physical unit prices: 2009 forward

Asphalt physical unit prices for 2009 forward are developed from individual state Department of Transportation data available online. A simple average of the reported weekly or monthly prices is calculated to estimate the average annual price. States that do not report prices – Arkansas, California, Colorado, Iowa, Michigan, Minnesota, Mississippi, North Dakota, Nebraska, Texas, Wisconsin, and the District of Columbia – are assigned their corresponding Census division simple average prices. For states with an incomplete series – Hawaii (2009 through 2011) and South Dakota (2014) – the corresponding Census division growth rate is applied to available data to estimate missing years.

Physical unit prices: 1970 through 2008

Asphalt physical unit prices for 1970 through 2008 are developed from monthly reports in the *Engineering News-Record*, a construction industry weekly magazine published by McGraw-Hill, Inc. The source data consist of monthly reports from correspondents in 20 U.S. cities with price quotes for tank cars, drums, or both, for the three major types of asphalt products: asphalt cement (AC-20), asphalt emulsion (rapid set and slow set), and asphalt cutback.

For 1986 through 2008, the tank car price is used. However, for 1986 and 1987, the drum price is used if a tank car price is not available. For 1970 through 1985, when both tank car and drum prices are available, a simple average of the two prices is used. When only one price is available, that price is used.

Asphalt prices are developed by calculating a simple average annual price from the monthly prices for each city for the three products. City prices are assigned to states. California, Ohio (1970 through 1985, and 1992 through 2008), and Pennsylvania have prices from two cities; in these cases, simple averages of the two city prices are used. No states have prices from more than two cities. Kansas City prices are assigned to Kansas and not used in the Missouri price estimates. An outlier data value for Minneapolis in June 1995 was omitted and the Minnesota price for 1995 is an 11-month average. States with no prices are assigned a Census division simple average price. If there is no Census division price, the simple average of the prices for the other Census divisions within that Census region is used.

State average asphalt prices are calculated as the quantity-weighted average prices of the three products for each state. Quantity data for 1970 through 1980 are taken from the Bureau of Mines and U.S. Energy Information Administration (EIA) reports on sales of asphalt. Quantity data for 1981 forward are taken from the *Asphalt Usage Survey for the United States and Canada*, published by the Asphalt Institute.

For 1970 through 1982, asphalt and road oil are estimated as separate data series. Asphalt prices are estimated as discussed above. Road oil prices are assumed to equal asphalt emulsion prices because specific prices are not available from any source.

Btu prices: all years

For 2009 forward, asphalt prices in dollars per short ton are converted to dollars per million Btu using the following factors: 5.5 barrels per short ton and 6.636 million Btu per barrel.

Before 2009, asphalt prices in dollars per short ton are converted to dollars per gallon by dividing by 235 gallons per short ton for asphalt cement, 241 gallons per short ton for emulsion, and 248.6 gallons per short ton for cutback. These prices are then multiplied by 42 gallons per barrel and divided by 6.636 million Btu per barrel to get dollars per million Btu. Road oil unit prices of dollars per short ton are converted to dollars per million Btu by using the constant conversion factors of 5.5 barrels per short ton and 6.636 million Btu per barrel. The average price of all asphalt and road oil is the consumption-weighted average of the individual product prices.

U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

2009 forward: State Department of Transportation websites, most of which are listed in U.S. Department of Transportation, Federal Highway Administration, AASHTO Subcommittee – Fall 2009, Subcommittee on Construction, Contract Administration Section, Survey on the Use of Price Adjustment Clauses, http://www.fhwa.dot.gov/programadmin/contracts/

aashto.cfm.

1970 through 2008: McGraw-Hill, Inc., *Engineering News-Record*, http://www.enr.com.

Quantities for calculating weighted average prices through 2008

1981-2008: Asphalt Institute, *Asphalt Usage Survey for the United States and Canada,* table titled "U.S. Asphalt Usage."

1977-1980: EIA, Energy Data Reports, *Sales of Asphalt* (1978-1980) and *Asphalt Sales, Annual* (1977), Table 2.

1970-1976: Bureau of Mines, U.S. Department of the Interior, Mineral Industry Survey, *Asphalt Sales, Annual* (1971-1976) and *Asphalt Shipments, Annual* (1970), Table 2.

Consumption

1970 forward: EIA State Energy Data System, industrial sector, asphalt and road oil consumption.

Conversion factors: all years

Conversion factors used are: 5.5 barrels per short ton of asphalt (2009 forward); 235 gallons per short ton of asphalt cement (1960–2008); 241 gallons per short ton of emulsion (1960–2008); 248.6 gallons per short ton of cutback (1960–2008); 42 gallons per barrel; 5.5 barrels per short ton of road oil; 6.636 million Btu per barrel.

Aviation Gasoline

Aviation gasoline prices are developed for the transportation sector. Estimates of the amount of aviation gasoline consumed by the transportation sector are taken from the State Energy Data System (SEDS). Aviation gasoline prices are national averages, excluding taxes, developed from several sources, depending on the years. In all cases, physical unit prices are developed and then converted to Btu prices. Federal and state excise taxes, as well as state and local sales taxes, are not included.

Physical unit prices: 2008 forward

Aviation gasoline prices for 2008 forward are assumed to be the national average refiners sales prices to end users published in the U.S. Energy Information Administration (EIA) *Petroleum Marketing Annual* (through 2009) and on the EIA website.

Physical unit prices: 1976 through 2007

Aviation gasoline prices for 1978 forward are assumed to be the national average refiners sales prices to end users published in EIA's *Annual Energy Review*. The 1976 and 1977 prices are assumed to be the national average retail prices published in EIA's *Monthly Energy Review*.

Physical unit prices: 1970 through 1975

For 1970 through 1975, aviation gasoline prices are not available. Prices are derived by dividing the national motor gasoline prices for those years by the 1976 national motor gasoline price and applying those percent changes to the 1976 national aviation gasoline price.

Btu prices: all years

Aviation gasoline Btu prices are calculated by converting the physical unit prices from dollars per gallon to dollars per barrel (42 gallons per barrel) and then to dollars per million Btu (5.048 million Btu per barrel).

Data sources

Prices

2010 forward: EIA, Petroleum & Other Liquids data website, Refiner Petroleum Product Prices by Sales Type, End Users—Aviation Gasoline, http://www.eia.gov/dnav/pet/pet_pri_refoth_a_EPPV_PTG_dpgal_a.htm.

2008, 2009: EIA, *Petroleum Marketing Annual,* http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma.html, Petroleum chapter Table 32, row titled "Refiner Prices of Aviation Gasoline, Sales to End Users", also available at http://www.eia.gov/dnav/pet/pet_pri_refoth_dcu_nus_a.htm.

1978-2007: EIA, *Annual Energy Review,* http://www.eia.gov/aer/contents.html, Petroleum chapter Table 5.22 (1991-2007), Table 5.20 (1979-1990), and Table 5.21 (1978), row titled "Sales Prices to End Users: Aviation Gasoline." Also available at http://www.eia.gov/dnav/pet/pet_pri_refoth_dcu_nus_a.htm.

1976, 1977: EIA, *Monthly Energy Review*, April 1984, page 106, column titled "Aviation Gasoline, Retail."

1970-1975: EIA, *Annual Energy Review 1989*, Table 70, column titled "Motor Gasoline, Leaded Regular, Nominal."

Consumption

1970 forward: EIA, State Energy Data System, transportation sector, aviation gasoline consumption.

Conversion factor: all years

5.048 million Btu per barrel.

Distillate Fuel Oil

Distillate fuel oil prices are developed for all sectors. Distillate fuel oil prices in the transportation sector are assumed to be No.2 diesel fuel prices through retail outlets. Estimates of the amount of distillate fuel oil consumed in each sector are taken from the State Energy Data System (SEDS). Estimated consumption for the industrial sector is adjusted to remove the estimated refinery consumption of distillate fuel oil in each state. (See the discussion in Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.)

Residential sector

Residential distillate fuel oil prices are developed by using a variety of data sources and several estimation methods, depending on the years involved. In all cases, physical unit prices for states are developed first, then Btu prices are calculated by using the physical unit prices and the conversion factor. The prices contained in this series are the retail prices paid by consumers for residential heating oil, including taxes.

Physical unit prices: 2011 forward

The survey that provides reseller and retailer sales prices for distillate fuel oil by sales type, Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," was discontinued in 2011. As a result, data for distillate prices by sales type, which are based on survey forms EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," and EIA-782B are no longer available. To estimate residential distillate fuel oil prices, regression equations are developed for each Petroleum Administration for Defense (PAD) district and subdistrict using historical refiner residential sales prices for No. 2 fuel oil and No. 2 diesel fuel from EIA-782A as the independent variables and the historical prices for residential distillate prices as the dependent variable. These regression equations are used to estimate the current residential distillate fuel oil prices for the PAD districts and subdistricts and for states that have refiner residential prices, historical refiner/reseller/retailer prices, and sizable sales volume—AK, MA, NH, NY, PA, and VT. All other states are assigned the corresponding PAD district or subdistrict estimated price. See Figure TN3 in "Introduction," at http://www.eia.gov/state/seds/sep_prices/notes/pr_intro.pdf. State general sales taxes are added to the state estimated prices.

For 2013 forward, refiners' prices for PAD subdistricts 1A and 1B are not available and are estimated by applying the growth rate of U.S. refiners' price to the previous year's subdistrict prices. Refiners' prices for states other than Alaska are also not available so the regression equation estimates cannot be computed. They are assigned the corresponding PADD district or subdistrict estimated price.

Physical unit prices: 1997 through 2010

For 1997 through 2009, physical unit distillate fuel oil prices in cents per gallon (excluding taxes) are generally available for 23 states from the U.S. Energy Information Administration (EIA) *Petroleum Marketing Annual (PMA).* State-level prices for the states without *PMA* prices are estimated by using the *PMA* Petroleum Administration for Defense (PAD) district or subdistrict prices. The estimation procedures are described below and include the addition of state general sales taxes.

1. State prices are generally available from the *PMA* for the following 23 states: AK, CT, DE, ID, IL, IN, MA, MD, ME, MI, MN, NH, NJ, NY, OH, OR, PA, RI, VA, VT, WA, WI, and WV. Prices for these states are converted from cents to dollars per gallon, and state general sales taxes from the U.S. Census Bureau and successor sources are added.
2. States that do not have prices in the *PMA* are assigned a *PMA* PAD district or subdistrict price, and state general sales taxes are added. For 2003 through 2008, the PAD District 3 residential price is withheld in the *PMA* and the PAD District 3 average distillate retail sales price is used instead. The states that are assigned PAD district or subdistrict prices are shown in Table TN4.1.

For 2010, *PMA* is no longer available, but the same set of physical unit prices in dollars per gallon (excluding taxes) are available on the EIA website.

Physical unit prices: 1983 through 1990 and 1992 through 1996

For 1983 through 1990 and 1992 through 1996, physical unit distillate fuel oil prices in cents per gallon (excluding taxes) are generally available for 23 states from the U.S. Energy Information Administration (EIA) *Petroleum Marketing Annual (PMA)*. For 1989 through 1993, prices represent No. 2 fuel oil, only. For 1994 forward, prices include other No. 2 distillates. State-level prices for the states without *PMA* prices are estimated by using price data from the American Gas Association (AGA), SEDS consumption data, and *PMA* Petroleum Administration for Defense (PAD) district or subdistrict prices. The estimation procedures are described below and include the addition of state general sales taxes.

1. State prices are generally available from the *PMA* for the following 23 states: AK, CT, DE, ID, IL, IN, MA, MD, ME, MI, MN, NH, NJ, NY, OH, OR, PA, RI, VA, VT, WA, WI, and WV. Prices for these states are converted from cents to dollars per gallon, and state general sales taxes from the

Table TN4.1. Distillate fuel oil residential sector PAD district and subdistrict price assignments, 1983 through 1990 and 1992 through 2010

State	Years	Assignments
AL	1997–2010	District 3
AR	1988, 1993–2010	District 3
AZ	1992–2010	District 5
CA	1984, 1992–2010	District 5
CO	1997–2010	District 4
DC	2000, 2002–2010	Subdistrict 1B
FL	1993, 1997–2010	Subdistrict 1C
GA	1996–2010	Subdistrict 1C
HI	1983–1990, 1992–2010	District 5
IA	1997–2010	District 2
IL	1986	District 2
KS	1986, 1989, 1996–2010	District 2
KY	1997–2010	District 2
LA	1986, 1996–2010	District 3
MI	2000, 2001	District 2
MO	1997–2010	District 2
MS	1983, 1985, 1986, 1995–2010	District 3
MT	1994, 1995, 1997–2010	District 4
NC	1997–2010	Subdistrict 1C
ND	1994, 1995, 1997–2010	District 2
NE	1996–2010	District 2
NM	1984–1990, 1992–2010	District 3
NV	1994, 1995, 1997–2010	District 5
OK	1986, 1989, 1990, 1992, 1993, 1995–2010	District 2
SC	1997–2010	Subdistrict 1C
SD	1986, 1995–2010	District 2
TN	1997–2010	District 2
TX	1992–1995, 1997–2010	District 3
UT	1985, 1995, 1997–2010	District 4
WY	1994, 1997–2010	District 4

U.S. Census Bureau and successor sources are added.

2. For the states that do not have prices in the *PMA*, prices are estimated by using AGA fuel oil prices, SEDS consumption data, and *PMA* PAD district or subdistrict prices. The following steps are used to estimate the prices:
   a. Distillate prices from the *PMA* for PAD districts or subdistricts are converted from cents per gallon to dollars per gallon.
   b. For 1983 through 1990 and 1992 through 1996, the AGA lists fuel oil prices by company for the principal city served in dollars per million Btu, including state sales taxes. A simple average of the city-level prices is used to derive a state-level price for each of the states without *PMA* prices for these years.
   c. The AGA state prices derived in step 2b are combined into PAD district or subdistrict averages by using SEDS consumption to weight each state's values. This procedure gives AGA consumption-weighted average prices for PAD districts and subdistricts comparable to the volume-weighted prices published in the *PMA*. The AGA PAD district and subdistrict averages are calculated by using only the available states; if a state does not appear in the survey, it is not included in the PAD district or subdistrict calculation.
   d. Adjustment factors, ratios of the *PMA* PAD district or subdistrict price divided by the AGA-derived PAD district or subdistrict price, are calculated.
   e. Prices for the states not published in the *PMA* are calculated by multiplying the AGA state prices derived in step 2b by the appropriate PAD district or subdistrict adjustment factor from step 2d and then adding state general sales taxes.
   f. States that do not have prices in either the *PMA* or the AGA are assigned a *PMA* PAD district or subdistrict price, and state general sales taxes are added. The states with assigned PAD district or subdistrict prices are as shown in Table TN4.1.

Physical unit prices: 1991

Physical unit distillate fuel oil prices in cents per gallon (excluding taxes) are available for 24 states from the *PMA*. Because prices are not available from AGA for 1991, state-level prices for the remaining 27 states are estimated by using physical unit prices derived for 1990 in SEDS and the 1991 *PMA* PAD district or subdistrict prices. The estimation procedures, including the addition of state general sales taxes, are described as follows:

1. State prices are available from the *PMA* for the following 24 states: AK, CT, DC, DE, ID, IL, IN, MA, MD, ME, MI, MN, NH, NJ, NY, OH, OR, PA, RI, VA, VT, WA, WI, and WV. Prices for these states are converted from cents to dollars per gallon, and state general sales taxes from the U.S Census Bureau's *State Government Tax Collections (SGTC)* are added.
2. For the remaining 27 states that do not have prices in the *PMA*, prices are estimated by using the 1990 SEDS physical unit prices and *PMA* PAD district or subdistrict prices for 1990 and 1991. The following steps are used to estimate the prices:
   a. For 1990, the Subdistrict 1C price is withheld in the *PMA* and the

average of the VA and WV prices is used as the Subdistrict 1C price.

b. The 1990 state prices derived from AGA and *PMA*, as described below, are adjusted by the percentage change in the 1990 and 1991 prices for each state's *PMA* PAD district or subdistrict.
c. The state general sales taxes from *SGTC* are added.

Physical unit prices: 1978 through 1982

Procedures for the 1978 through 1982 period are similar to those for 1983 forward except for changes in data sources. Annual physical unit prices are either taken directly from the *Monthly Energy Review (MER)* or calculated from monthly regional price data, also from the *MER*. These data were collected on Form EIA-9A (formerly EIA Form 9 and FEA Form P112—1) and include taxes. Price data from *Platt's Oil Price Handbook and Oilmanac (Platt's)* and SEDS consumption data for 1978 through 1982 are used to compute state prices when only regional data are available. These calculations are described step-by-step below.

1. Annual state physical unit prices are generally available from the *MER* for the same 23 states covered by the *PMA* in 1983 and forward. These 23 states compose all of Federal Regions 1, 2, 3, 5, and 10 (see Figure TN2 in "Introduction," at http://www.eia.gov/state/seds/sep_prices/notes/pr_intro.pdf). Prices for these states exclude taxes and are converted to dollars per gallon.
2. Of the states without *MER* prices, the 22 in Federal Regions 4, 7, 8, and 9 have annual prices estimated from the monthly federal regional prices published in the *MER*. No regional prices are available for Federal Region 6 for the 1978 through 1982 period, and some monthly prices are missing in regions 7, 8, and 9 in 1980, 1981, and 1982.
   a. Missing monthly prices for federal regions are estimated with assigned prices as follows: the Region 9 November 1980 price is assigned to December 1980; an average of the Region 7 July and October 1982 prices is assigned to August and September 1982; an average of Region 8 June and September 1982 prices is assigned to July and August 1982; and an average of Region 3 August and October 1982 prices is assigned to September 1982. Imputation of missing Region 6 prices for 1978 through 1982 and missing Region 9 prices for 1981 and 1982 is discussed later.
   b. The simple average of monthly state-level normal heating degree-day data is averaged for all the states within each of the 10 federal regions and is used to estimate average federal region heating degree-days. AK, DC, and HI are assigned the monthly heating degree-days from MN, MD, and FL, respectively.
   c. Weighted average annual physical unit distillate prices for the residential sector are calculated for Federal Regions 4, 7, 8, and 9 (except for Region 9 in 1981 and 1982) by using the regional normal heating degree-days and the monthly regional prices from the *MER*.
   d. In 1981, only March and May prices are available for Federal Region 9. To estimate the average annual price for this region, the relationship between the U.S. annual heating oil price (from the *MER*) and the U.S. March and May prices is expressed as a ratio and is used with the Region 9 March and May prices to estimate the 1981 annual Region 9 price.
   e. City-level prices from *Platt's* are assigned to states as shown in Table TN4.2 The assigned state-level *Platt's* prices for states are consumption-weighted into federal regions by using residential sector consumption data from SEDS.
   f. Adjustment factors, ratios of the regional *MER* distillate prices to the regional *Platt's*-based distillate prices, are calculated for Federal Regions 4, 7, 8, and 9 (except for 1982).
   g. Since there are no monthly regional distillate prices from the *MER* for Federal Region 6 for 1978 through 1982 and Federal Region 9 for 1982, the adjustment factors for these regions are based on the adjustment factors for previous time periods. The Region 6 adjustment factor for each of the years in the 1978 through 1982 period is equal to 1.1313, which is the average of the adjustment factor for the West South Central Census Division for 1976 and 1977. The Region 9 adjustment factor for 1982 is equal to 1.1995, which is the average adjustment factor for Region 9 from 1978 through 1981.
   h. The residential sector distillate state prices for the 27 states in Federal Regions 4, 6, 7, 8, and 9 are calculated by multiplying the regional adjustment factors for each year and the state-level assigned *Platt's* prices.

Physical unit prices: 1975 through 1977

For the years 1975 through 1977, no state-level data are available, and regional data from Form EIA-9A are available only at the Census division level, except for federal region prices for November and December of 1977. Using a methodology similar to that described above for the allocation of regional data to states, adjustment factors are calculated at the regional level and applied to *Platt's* price data assigned to states. The resulting prices implicitly include average regional taxes but do not reflect individual state differences.

1. Monthly regional price data for 1975 and 1976 are reported in the *MER* only for Census divisions. In 1977, however, monthly price data are reported for Census divisions for January through October and for federal regions for November and December. The federal region prices

Table TN4.2. Platt's prices for No. 2 fuel assigned to states, 1970 through 1982

State	Years	Assigned city or state prices	State	Years	Assigned city or state prices	State	Years	Assigned city or state prices
AK	1970–1976	Los Angeles/San Francisco, CA	KY	1970	Baton Rouge/New Orleans, LA			Columbus/Dayton
	1977, 1978	Portland, OR		1971–1982	New Orleans, LA		1973–1982	Detroit, MI
	1979, 1980	Seattle, WA	LA	1970	Baton Rouge/New Orleans	OK	1970–1982	Oklahoma (Group 3)
	1981, 1982	Seattle-Tacoma/Spokane, WA		1971–1982	New Orleans	OR	1970–1976	Los Angeles/San Francisco, CA
AL	1970–1974	Birmingham/Mobile/Montgomery	MA	1970–1982	Boston		1977–1982	Portland
	1975–1977	Mobile/Birmingham	MD	1970–1982	Baltimore	PA	1970–1978	Philadelphia
	1978–1982	Birmingham	ME	1970–1982	Portland		1979–1982	Philadelphia/Pittsburgh
AR	1970–1982	Arkansas	MI	1970–1982	Detroit	RI	1970–1975	Providence
AZ	1970–1978	Los Angeles/San Francisco, CA	MN	1970–1982	Minneapolis-St. Paul		1976–1982	New Haven, CT
	1979–1982	Phoenix	MO	1970	Baton Rouge/New Orleans, LA	SC	1970–1975	Charleston/Spartanburg/Belton
CA	1970–1982	Los Angeles/San Francisco		1971–1973	New Orleans, LA		1976–1982	Charleston/Spartanburg
CO	1970–1976	Minneapolis-St. Paul, MN		1974–1982	St. Louis	SD	1970–1982	Minneapolis-St. Paul, MN
	1977–1982	Denver	MS	1970–1973	Greenville/Meridian	TN	1970–1973	Chattanooga
CT	1970–1982	New Haven		1974–1982	New Orleans, LA		1974–1982	New Orleans, LA
DC	1970–1982	Baltimore, MD	MT	1970–1976	Minneapolis-St. Paul, MN	TX	1970–1972	New Mexico-West Texas
DE	1970–1982	Baltimore, MD		1977–1982	Billings		1973–1978	New Orleans, LA
FL	1970–1972	Jacksonville/Miami/Tampa/	NC	1970–1973	Greensboro/Wilmington/Charlotte/		1979, 1980	Houston
		Pensacola/Panama City/Port			Salisbury/Selma		1981	Dallas-Fort Worth/Houston
		Everglades		1974–1975	Greensboro/Wilmington/Charlotte		1982	Amarillo/Corpus Christi/Dallas Fort
	1973	Miami/Tampa/Pensacola		1976–1982	Greensboro/Wilmington			Worth/Houston
	1974–1975,	Miami/Tampa	ND	1970–1982	Minneapolis-St. Paul, MN	UT	1970–1976	Minneapolis-St. Paul, MN
	1981–1982		NE	1970	Baton Rouge/New Orleans, LA		1977–1982	Salt Lake City
	1976–1980	Miami		1971–1973	New Orleans, LA	VA	1970–1973	Norfolk/Roanoke
GA	1970–1973	Atlanta/Savannah/Albany/Athens/		1974–1982	St. Louis, MO		1974–1982	Norfolk
		Bainbridge/Columbus/Macon	NH	1970–1982	Portland, ME	VT	1970–1982	Portland, ME
	1974–1982	Atlanta/Savannah	NJ	1970–1975	New York/Albany/Buffalo, NY	WA	1970–1976	Los Angeles/San Francisco, CA
HI	1970–1982	Los Angeles/San Francisco, CA		1976–1982	New York/Albany, NY		1977, 1979,	Seattle
IA	1970–1981	Chicago, IL	NM	1970–1972	New Mexico-West Texas		1980	
	1982	Des Moines		1973–1976	Los Angeles/San Francisco, CA		1978	Portland, OR
ID	1970–1976	Los Angeles/San Francisco, CA		1977–1980	Albuquerque		1981–1982	Seattle-Tacoma/Spokane
	1977–1982	Portland, OR		1981, 1982	Albuquerque/Farmington	WI	1970–1982	Chicago, IL
IL	1970–1982	Chicago	NV	1970–1982	Los Angeles/San Francisco, CA	WV	1970–1973	Norfolk/Roanoke, VA
IN	1970–1982	Chicago, IL	NY	1970–1975	New York/Albany/Buffalo		1974–1982	Norfolk, VA
KS	1970–1973	Los Angeles/San Francisco, CA		1976–1982	New York/Albany	WY	1970–1976	Minneapolis-St, Paul, MN
	1974–1982	St. Louis, MO	OH	1970–1972	Toledo/Cleveland/Zanesville/		1977–1982	Cheyenne

for November and December are assigned to their respective states and reaggregated into Census divisions in order to create a consistent set of monthly Census division prices for 1977. Annual residential sector distillate consumption data from SEDS are used to do the reaggregation.

2. The Census division monthly price data from the *MER* for 1975, 1976, and the first 10 months of 1977 are used with the estimated Census division price data for November and December 1977 to estimate state-level prices.
   a. Missing monthly prices in the East South Central Division for June and November 1975 and the Mountain Division for March and July 1975 are estimated by using an average of the prices for the month preceding and the month following the missing month. Missing November and December West South Central Division prices in 1977 are estimated with the assignment of the October price to both months. No monthly price data are available for the West South Central Division in 1975; step 2f., below, discusses how the calculations are handled for this division.
   b. The monthly state-level normal heating degree-day data are averaged for the states within each Census division to estimate regional monthly heating degree-days. AK, DC, and HI are assigned the monthly heating degree-days from MN, MD, and FL, respectively.
   c. Weighted average annual distillate prices for Census divisions are calculated by using the monthly Census division price data from the *MER* and the normal heating degree-days estimated for Census divisions.
   d. City-level No. 2 fuel oil refinery and terminal prices from *Platt's* for 1975 through 1977 are assigned to states as shown in Table TN4.2. The assigned *Platt's* prices for states are consumption-weighted into Census divisions by using residential sector consumption data from SEDS.
   e. Adjustment factors are calculated as the ratios of the *MER* distillate Census division prices to the *Platt's* distillate Census division prices.
   f. Since there are no 1975 *MER* price data for the West South Central Division from which to calculate an adjustment factor, the 1975 adjustment factor for this region is assumed to be equal to the simple average of the West South Central adjustment factors for 1976 and 1977 (i.e., 1.1313).
   g. The residential sector distillate state prices for all states are calculated by multiplying the regional adjustment factors for each year by the state-level assigned *Platt's* prices.

Physical unit prices: 1970 through 1974

There are no regional or state-level distillate fuel oil price data directly available for the 1970 through 1974 period. To estimate state prices, regional average prices are first derived from the relationship between U.S. prices and federal region prices for 1975 through 1980. State prices are then estimated from the regional prices by using a methodology similar to that described for 1978 through 1982. The resulting prices implicitly include average regional taxes but do not reflect individual state differences.

1. The first step in the estimation of residential distillate prices for the 1970 through 1974 time period is to develop an equation that uses U.S. prices to estimate prices for federal regions. Regression techniques are used for this purpose. U.S. prices for 1975 through 1980 from the *Annual Energy Review (AER)* are used as the independent variable for developing the equation; annual federal region prices are used as the dependent variable. Federal region prices for 1978 through 1980 are calculated above, but *MER* prices for 1975 through 1977 are for Census divisions. To convert these annual Census division prices into federal region prices, the estimated state prices for 1975 through 1977 are aggregated into federal regions by using SEDS consumption data.
2. Regression techniques are applied to the pooled federal region price data (dependent variable) and the U.S. prices from the *AER* (independent variable) for 1975 through 1980. U.S. prices for 1970 through 1974 are input to estimate annual federal region prices for 1970 through 1974.
3. City-level prices from *Platt's* for 1970 through 1974 are assigned to states as shown in Table TN4.2. The assigned state-level *Platt's* prices are consumption-weighted into federal regions by using residential sector distillate consumption data from SEDS.
4. Adjustment factors, which are ratios of the regional *MER* distillate federal region prices to the *Platt's*-based distillate federal region prices, are calculated.
5. The residential sector distillate prices for all states are calculated by multiplying the regional adjustment factors for each year by the state-level assigned *Platt's* prices.

Btu prices: all years

Btu prices for states are computed by converting the physical unit prices in dollars per gallon to dollars per barrel (42 gallons per barrel). The prices are then converted to dollars per million Btu using the conversion factors calculated by EIA and presented in SEDS Consumption Technical Notes, Table B1. U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

2011 forward: Unpublished price data from EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report."

2010: EIA, Petroleum & Other Liquids data website, No. 2 Distillate Prices by Sales Type, http://www.eia.gov/dnav/pet/pet_pri_dist_a_EPD2_PRT_dpgal_a.htm.

1983-2009: EIA, *Petroleum Marketing Annual 1985*, Volume 1, Table 25 (1983-1985) and annual issues of the *Petroleum Marketing Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html, Table 36 (1986-1988), Table 38 (1989-1993), Table 39 (1994-2006), and Table 35 (2007-2009), column titled "Sales to End Users—Residential Consumers."

1983-1990, 1992 through 1996: AGA, *Residential Natural Gas Market Survey* (1989, 1990, 1992-1996), and *Gas Househeating Survey* (1983-1988), Appendix titled, "Competitive Fuel Prices," column titled "Distillate."

1970-1982: McGraw-Hill, Inc., *Platt's Oil Price Handbook and Oilmanac*, refinery and terminal prices for No. 2 fuel oil, average of highs and lows.

1975-1982: National Oceanic and Atmospheric Administration, U.S. Department of Commerce, *State, Regional, and National Monthly and Seasonal Heating Degree-Days Weighted by Population (1980 Census)*, Historical Climatology Series 5-1, table titled "1951-80 State Pop. Wgt'd Heating Degree-Days."

1975-1982: EIA, *Monthly Energy Review,* table titled "Residential Heating Oil Prices by Region," February 1978, page 67 (1975, 1976); April 1980, page 83 (1977, 1978); July 1982, page 87 (1979-1982).

1970-1982: EIA, *Annual Energy Review 1988*, Table 67, "Motor Gasoline and Residential Heating Oil Prices, 1949-1988."

Taxes

For 1992 forward, an annual average general sales tax is calculated for each state as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the state general sales tax as of September 1 of each year is used.

For 2009, the Federation of Tax Administrators did not publish state general sales tax data, but did publish state general sales tax data for 2010. Therefore, the 2009 tax rates were estimated by comparing the Federation of Tax Administrators' 2008 and 2010 rates for each respective state. If no change occurred between 2008 and 2010, it has been assumed the rate remained constant in 2009. If a rate did change between those years, the State Department of Revenue was consulted to determine the effective date of the rate change to be used in the 2009 estimates accordingly.

1996 forward: Federation of Tax Administrators, http://www.taxadmin.org/current-tax-rates.

1995: The Council of State Governments, *The Book of the States 1994-95* and *1996-97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism,* Tables 14 and 26.

1993: Census Bureau, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled "State Gasoline, Sales and Cigarette Tax Rates as of July 1, 1993."

1983-1992: Census Bureau, U.S. Department of Commerce, *State Government Tax Collections*, table titled "State Government Excises on General Sales, Motor Fuel, and Cigarettes, Beginning and End of Fiscal Year," column "Percentage rate, Sept. 1."

Consumption

1970 forward: EIA, State Energy Data System, residential sector distillate consumption.

Conversion factors: all years

1970 forward: EIA, State Energy Data System, Consumption Technical Notes, Table B1.

Commercial sector

Commercial sector distillate prices are estimated by using several different data sources and estimation methodologies, depending on the years involved. For 2011 forward, commercial distillate prices are estimated using regional-level regression equations (see below). For 1983 through 2009, retail prices paid by commercial/institutional establishments (excluding taxes) for No. 2 distillate fuel oil are taken from the EIA's *Petroleum Marketing Annual (PMA)*. For 2010, *PMA* is no longer available, but the same set of physical unit prices in dollars per gallon (excluding taxes) are available on the EIA website. State general sales taxes from the U.S. Census Bureau and successor sources are added. For 1970 through 1982, commercial distillate prices are based on refinery and terminal (wholesale) prices from *Platt's* and markups from Fostor Associates, Inc. *Energy Prices*: 1960-73 that include taxes. Btu prices

are computed by using the physical unit prices and the conversion factor.

Physical unit prices: 2011 forward

The survey that provides reseller and retailer sales prices for distillate fuel oil by sales type, Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," was discontinued in 2011. As a result, data for distillate prices by sales type, which are based on survey forms EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," and EIA-782B are no longer available. To estimate commercial distillate fuel oil prices, regression equations are developed for each Petroleum Administration for Defense (PAD) district and subdistrict using historical refiner commercial sales prices for No. 2 diesel fuel from EIA-782A as the independent variable and the historical prices for commercial distillate prices as the dependent variable. These regression equations are used to estimate the current commercial distillate fuel oil prices for the PAD districts and subdistricts and for states that have historical refiner/reseller/retailer prices and sizable sales volume—AK, CT, DE, ID, IL, IN, MA, MD, MI, MN, NH, NJ, NY, OH, OR, PA, VA, VT, WA, WI, and WV, provided that they have refiner commercial prices. All other states are assigned the corresponding PAD district or subdistrict estimated price. They are shown in Table TN4.3. State general sales taxes are added to the state estimated prices.

Physical unit prices: 1983 through 2010

Physical unit No. 2 distillate prices in dollars or cents per gallon (excluding taxes) are generally available for 24 states. State-level prices for the remaining 27 states are estimated by using the Petroleum Administration for Defense (PAD) district or subdistrict prices as shown in Table TN4.3. State general sales taxes are then added.

Physical unit prices: 1970 through 1982

Commercial sector distillate physical unit prices for 1970 through 1982 are calculated by using *Platt's* prices assigned to states and commercial sector markups estimated from *Energy Prices: 1960-73*. The resulting estimates implicitly include state-specific taxes.

1. The first step is to compute the markups. *Energy Prices* contains single price estimates for small commercial users and two price estimates for large commercial users for 10 cities: Boston, MA; Albany, NY; New York, NY; Charlotte, NC; Washington, DC; Chicago, IL; Detroit MI; Minneapolis/St. Paul, MN; St. Louis, MO; and Seattle, WA. First, a simple average of the two large commercial prices is calculated for each city except for Albany and New York. In this case, all four large commercial prices are averaged together, since cities are assigned to their respective states.
2. For the nine states covered by the *Energy Prices* data (noted in step 1), the markup of the reported prices from *Energy Prices* over the assigned *Platt's* prices (Table TN4.2 on page 38) and the markup of the residential prices calculated above for 1970 through 1972 over the *Platt's* prices is calculated.

Table TN4.3. Distillate fuel oil commercial sector PAD district and subdistrict price assignments, 1983 forward

States	Years	Assignments
AL	1983–2014	District 3
AR	1983–2014	District 3
AZ	1983–2014	District 5
CA	1983–2014	District 5
CO	1983–2014	District 4
CT	2014	Subdistrict 1A
DC	2011–2014	Subdistrict 1B
FL	1983–2014	Subdistrict 1C
GA	1983–2014	Subdistrict 1C
HI	1983–2014	District 5
IA	1983–2014	District 2
KS	1983–2014	District 2
KY	1983–2014	District 2
LA	1983–2014	District 3
ME	2011–2014	Subdistrict 1A
MO	1983–2014	District 2
MS	1983–2014	District 3
MT	1983–2014	District 4
NC	1983–2014	Subdistrict 1C
ND	1983–2014	District 2
NE	1983–2014	District 2
NM	1983–2014	District 3
NV	1983–2014	District 5
OK	1983–2014	District 2
RI	2011–2014	Subdistrict 1A
SC	1983–2014	Subdistrict 1C
SD	1983–2014	District 2
TN	1983–2014	District 2
TX	1983–2014	District 3
UT	1983–2014	District 4
WY	1983–2014	District 4

3. At this point, residential and commercial sector retail markups have been computed for nine states for each of the years 1970 through 1972. The next step is to calculate the average retail markup for the 3-year period for each sector. A simple average of the markup ratios is calculated.
4. The average commercial and residential sector retail markups for the nine available states are assigned, as shown in Table TN4.4.
5. To translate the average commercial and residential markups for 1970 through 1972 into the estimated commercial sector retail markups to be used for 1970 through 1982, the relationship between these two markups is used, with the residential markups calculated for all states for each year. The calculation of the residential markups follows the same procedure used in step 2.
6. The commercial sector adjustment factors for each state for each of the years 1970 through 1982 are multiplied by the corresponding *Platt's* prices for 1970 through 1982 to calculate the final commercial sector physical unit prices.

Btu prices: all years

Btu prices for states are calculated by converting the physical unit prices from dollars per gallon to dollars per barrel (42 gallons per barrel) and then to dollars per million Btu using the conversion factors calculated by EIA and presented in SEDS Consumption Technical Notes, Table B1. U.S. prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

2011 forward: Unpublished price data from EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report."

2010: EIA, Petroleum & Other Liquids data website, No. 2 Distillate Prices by Sales Type, http://www.eia.gov/dnav/pet/pet_pri_dist_a_EPD2_PCS_dpgal_a.htm.

1983-2009: EIA, *Petroleum Marketing Annual 1985, Volume 1,* Table 25 (1983-1985) and annual issues of the *Petroleum Marketing Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html, Table 36 (1986-1988), Table 38 (1989-1993), Table 39 (1994-2006), and Table 35 (2007-2009), column titled "Sales to End Users—Commercial/Institutional Consumers."

1970-1982: McGraw-Hill, Inc., *Platt's Oil Price Handbook and Oilmanac*, refinery and terminal prices for No. 2 fuel oil, average of highs and lows.

1970-1982: Foster Associates, Inc., 1974, *Energy Prices 1960-73*, Tables 4-c and 5-b.

Taxes

For 1992 forward, an annual average general sales tax is calculated for each state as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the state general sales tax as of September 1 of each year is used.

For 2009, the Federation of Tax Administrators did not publish state general sales tax data, but did publish state general sales tax data for 2010. Therefore, the 2009 tax rates were estimated by comparing the Federation of Tax Administrators' 2008 and 2010 rates for each respective state. If no change occurred between 2008 and 2010, it has been assumed the rate remained constant in 2009. If a rate did change between those years, the State Department of Revenue was consulted to determine the effective date of the rate change to be used in the 2009 estimates accordingly.

1996 forward: Federation of Tax Administrators, http://www.taxadmin.org/current-tax-rates.

1995: The Council of State Governments, *The Book of the States 1994-95* and *1996-97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism,* Tables 14 and 26.

1993: Census Bureau, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled "State Gasoline, Sales and Cigarette Tax Rates as of July 1, 1993."

1983-1992: Census Bureau, U.S. Department of Commerce, State Government Tax Collections, table titled "State Government Excises on General Sales, Motor Fuel, and Cigarettes, Beginning and End of Fiscal Year," column "Percentage rate, Sept. 1."

Consumption

1970 forward: EIA, State Energy Data System, commercial sector distillate consumption.

Conversion factors: all years

1970 forward: EIA, State Energy Data System, Consumption Technical Notes, Table B1.

Table TN4.4. Distillate fuel oil commercial sector average retail markup price assignments, 1970 through 1972

State	City price assignments	State	City price assignments
AK	Seattle, WA	MT	Minneapolis-St. Paul, MN
AL	Charlotte, NC	NC	Charlotte, NC
AR	St. Louis, MO	ND	Minneapolis-St. Paul, MN
AZ	Seattle, WA	NE	St. Louis, MO
CA	Seattle, WA	NH	Boston, MA
CO	Minneapolis-St. Paul, MN	NJ	Albany and New York, NY
CT	Boston, MA	NM	Seattle, WA
DC	Washington, DC	NV	Seattle, WA
DE	Washington, DC	NY	Albany and New York, NY
FL	Charlotte, NC	OH	Detroit, MI
GA	Charlotte, NC	OK	St. Louis, MO
HI	Seattle, WA	OR	Seattle, WA
IA	St. Louis, MO	PA	Albany and New York, NY
ID	Seattle, WA	RI	Boston, MA
IL	Chicago, IL	SC	Charlotte, NC
IN	Chicago, IL	SD	Minneapolis-St. Paul, MN
KS	St. Louis, MO	TN	Chicago, IL
KY	Chicago, IL	TX	St. Louis, MO
LA	St. Louis, MO	UT	Minneapolis-St. Paul, MN
MA	Boston, MA	VA	Washington, DC
MD	Washington, DC	VT	Boston, MA
ME	Boston, MA	WA	Seattle, WA
MI	Detroit, MI	WI	Chicago, IL
MN	Minneapolis-St. Paul, MN	WV	Washington, DC
MO	St. Louis, MO	WY	Minneapolis-St. Paul, MN
MS	Charlotte, NC		

Electric power sector

The price of distillate fuel oil used for electric power is the average delivered cost of No. 2 distillate fuel oil receipts at electric plants. For 1973 through 2009, these prices are taken from the EIA *Cost and Quality of Fuels for Electric Plants (C&Q)*. For 2010 forward, C&Q is no longer available, but data on the cost of distillate fuel oil delivered to the electric utilities are available from the Office of Electricity, Renewables, and Uranium Statistics (ERUS). For 1970 through 1972, prices from Edison Electric Institute's *Statistical Yearbook of the Electric Utility Industry* are used with regression analysis. Btu prices are developed directly from the data sources and include all applicable taxes.

Prices: 1973 forward

Contiguous 48 states

Btu prices for 1973 forward are reported in the EIA *C&Q* or are available from ERUS. For 1973, 1974, and 1980 forward, Btu prices are taken directly from the data source and are converted from cents per million Btu to dollars per million Btu. For 1975 through 1979, consumption-weighted average Btu prices are calculated from prices and consumption reported separately for steam-electric plants and for combustion turbine and internal combustion units. Wherever individual state prices are unavailable, quantity-weighted Census division prices are assigned, as shown in Table TN4.5.

Alaska

Btu prices for Alaska for 2005, 2006, and 2008 through 2012 are available from the source. For 2013 forward, the quantity-weighted Census division

Table TN4.5. Distillate fuel oil electric plant Census division price assignments, 1973 forward

State	Years	Census division
AK	2013, 2014	Pacific Noncontiguous
CA	1983–1985, 1987, 1988	Pacific
	1990–1992, 1995–1997, 2002, 2007, 2013,	Pacific Contiguous
	2014	
CO	1996–1998	Mountain
CT	1973, 2000–2007, 2011, 2013, 2014	New England
DC	1973, 2002–2012	South Atlantic
DE	1973, 2006, 2007, 2011–2014	South Atlantic
HI	2002–2004	Pacific Contiguous
	2005–2007	Pacific Noncontiguous
ID	1973, 1974, 1976, 1980–2009, 2011–2014	Mountain
MA	2011	New England
MD	1973, 2002–2007, 2011–2014	South Atlantic
ME	1973, 1974, 1999–2007, 2011–2014	New England
MT	1973–1975, 1977, 1983, 2000, 2001,	Mountain
	2007, 2012–2014	
NH	1973, 1974	New England
NJ	1973, 1974, 2011–2014	Mid-Atlantic
NV	2007	Mountain
NY	2002	Mid-Atlantic
OK	2011	West South Central
OR	1987, 1988	Pacific
	1996	Pacific Contiguous
PA	2007, 2011–2014	Mid-Atlantic
RI	1976–1994, 1997–2007, 2011–2014	New England
SD	1973, 1974, 1992, 1994, 1995,	West North Central
	1997–2002, 2007	
TN	1973	East South Central
VT	1973, 1974, 1978, 1983–1992, 1999,	New England
	2001–2004, 2006, 2007, 2009, 2011, 2013	
	2014	
WA	1973–1977	Pacific
	2002–2005, 2007	Pacific Contiguous
WV	1973	South Atlantic
WY	1973	Mountain

prices are assigned to the missing prices, as shown in Table TN4.5. For 1994 through 2010, missing prices are estimated as the consumption-weighted averages of prices reported by power plants taken from FERC Form 1, Form EIA-412 (1994-2000), and the Alaska Energy Authority publication, *Statistical Report of the Power Cost Equalization Program*.

Prior to 1994, prices are estimated each year by calculating the ratio of the Alaska price from the *Statistical Yearbook* to the *Statistical Yearbook* U.S. price and multiplying the ratio by the *C&Q* U.S. price for that year. Alaska prices for 1973, 1975, and 1978 are not published in the *Statistical Yearbook* and are estimated by calculating an average of the ratios of the Alaska to U.S. *Statistical Yearbook* prices in adjacent years. The 1973 estimated price is based on the average ratio for 1972 and 1974, the 1975 price is based on the average ratio for 1974 and 1976, and the 1978 price is based on the average ratio for 1977 and 1979. The average ratio is then applied to the U.S. *C&Q* price for the missing year.

Hawaii

The *C&Q* does not have prices for Hawaii from 1973 through 1982, 1992 through 1996, and 2002 through 2007. Price assignments for 2002 forward are shown in Table TN4.5. Prices for Hawaii from 1994 through 1996 are estimated as the consumption-weighted averages of prices reported by power plants taken from FERC Form 1 and Form EIA-412.

Prior to 1994, prices are estimated each year by calculating the ratio of the Hawaii price from the *Statistical Yearbook* to the *Statistical Yearbook* U.S. price and multiplying the ratio by the *C&Q* U.S. price for that year.

U.S. prices

U.S. Btu prices for all years are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Prices: 1970 through 1972

Btu prices for 1970 through 1972 are estimated by using data from *Statistical Yearbook of the Electric Utility Industry*. U.S. prices are then computed by using the state-level prices and the electric utility distillate consumption data from SEDS.

1. Regression techniques are used to arrive at the equation for estimating electric utility sector distillate prices for the 1970 through 1972 period. Alabama is treated as the reference state. The regression equation uses *Statistical Yearbook* state-level prices for 1974 through 1980 as the independent variable and the state-level prices calculated above for 1974 through 1980 as the dependent variable. Substituting Btu prices for 1970 through 1972 from the *Statistical Yearbook* into the regression equation yields the estimated electric utility sector state-level distillate prices.

2. Wherever individual state prices are unavailable, quantity-weighted Census division prices are assigned as follows: ID in 1970 through 1972; TN in 1970; and WA in 1970 and 1971. AK in 1971 is calculated as the average of the AK price in 1970 and 1972.
3. U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

2010 forward: EIA, Office of Electricity, Renewables, and Uranium Statistics, data on average delivered cost of distillate fuel oil to regulated electric power plants.

1973-2009: EIA, *Cost and Quality of Fuels for Electric Plants*, http://www.eia.gov/electricity/cost_quality/, Table 6 (1973, 1974); Tables 5, 6, 12, 13 (1975-1979); Table 45 (1980-1982); Table 51 (1983, 1984); Table 41 (1985-1989); Table 14 (1990, 1991); Table 8 (1992-2000), Table 9 (2001), Table 7.B (2002 and 2003), Table 7.A (2004-2008), and Table 11 (2009).

1994-2004, 2007 (Alaska), and 1994 through 1996 (Hawaii): EIA, unpublished prices reported by electric power plants in AK and HI on FERC Form 1, "Annual Report of Major Electric Utilities, Licensees, and Others,"; Form EIA-412, "Annual Electric Industry Financial Report" (previously, "Annual Report of Public Electric Utilities,") http://www.eia.gov/electricity/data/eia412/ (1994-2000), and AK's *Statistical Report of the Power Cost Equalization Program*, http://www.akenergyauthority.org/Programs/PCE/.

1970-1993: Edison Electric Institute, *Statistical Yearbook of the Electric Utility Industry*, table titled, "Analysis of Fuel for Electric Generation-Total Electric Utility Industry" (1970-1988) and table titled, "Fossil Fuels Used for Electric Generation Total Electric Utility Industry" (1990-1993).

Consumption

1970 forward: EIA, State Energy Data System, electric power sector distillate consumption.

Conversion factors: all years

Btu prices are developed directly from data sources, except for AK for 1994 through 2004. The conversion factor used in these instances is 5.825 million Btu per barrel.

Industrial sector

The industrial sector distillate fuel oil prices are developed by using a variety of data sources and several estimation methods, depending on the years involved. For 2011 forward, industrial distillate prices are estimated using regional-level regression equations (see below). For 1983 through 2009, prices of No. 2 distillate fuel oil (excluding taxes) are reported by the *Petroleum Marketing Annual (PMA)*. For 2010, *PMA* is no longer available, but the same set of physical unit prices in dollars per gallon (excluding taxes) are available on the EIA website. State general sales taxes from the U.S. Census Bureau and successor sources are added. For 1970 through 1982, prices are the average cost of distillate to manufacturing firms and implicitly include taxes that reflect individual state differences.

Physical unit prices: 2011 forward

The survey that provides reseller and retailer sales prices for distillate fuel oil by sales type, Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," was discontinued in 2011. As a result, data for distillate prices by sales type, which are based on survey forms EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," and EIA-782B are no longer available. To estimate industrial distillate fuel oil prices, regression equations are developed for each Petroleum Administration for Defense (PAD) district and subdistrict using historical refiner industrial sales prices for No. 2 diesel fuel and No. 2 fuel oil from EIA-782A as the independent variables and the historical prices for industrial distillate prices as the dependent variable. These regression equations are used to estimate the current industrial distillate fuel oil prices for the PAD districts and subdistricts and for states that have historical refiner/reseller/retailer prices and sizable sales volume—AK, DE, ID, IL, IN, MD, MN, NJ, NY, PA, VA, and WA, provided that they have refiner industrial prices. All other states are assigned the corresponding PAD district or subdistrict estimated price, provided that they have reported refiner industrial prices. They are shown in Table TN4.6. State general sales taxes are added to the state estimated prices.

Physical unit prices: 1983 through 2010

Physical unit distillate fuel oil prices in dollars or cents per gallon (excluding taxes) are generally available for 24 states. State-level prices for the remaining 27 states are estimated by using the Petroleum Administration for Defense (PAD) district or subdistrict prices, as shown in Table TN4.6, state general sales taxes are then added.

In 2000, the PAD District 4 average industrial sector price was withheld in the PMA. PAD District 4 commercial and industrial sector prices for 1995 through 1999 were compared and the average percentage difference between

Table TN4.6. Distillate fuel oil industrial sector PAD district and subdistrict price assignments, 1983 forward

State	Years	Assignments
AL	1983–2014	District 3
AR	1983–2014	District 3
AZ	1983–2014	District 5
CA	1983–2014	District 5
CO	1983–2014	District 4
CT	2011–2014	Subdistrict 1A
DC	1994, 1997–2001, 2003–2014	Subdistrict 1B
FL	1983–2004, 2007–2014	Subdistrict 1C
	2005, 2006	District 1
GA	1983–2004, 2007–2014	Subdistrict 1C
	2005, 2006	District 1
HI	1983–2014	District 5
IA	1983–2014	District 2
IL	2005, 2006	District 2
KS	1983–2014	District 2
KY	1983–2014	District 2
LA	1983–2014	District 3
MA	2010–2014	Subdistrict 1A
MD	2014	Subdistrict 1B
ME	1997, 2011–2014	Subdistrict 1A
MI	2001, 2011–2014	District 2
MO	1983–2014	District 2
MS	1983–2014	District 3
MT	1983–2014	District 4
NC	1983–2004, 2007–2014	Subdistrict 1C
	2005, 2006	District 1
ND	1983–2014	District 2
NE	1983–2014	District 2
NH	2011–2014	Subdistrict 1A
NM	1983–2014	District 3
NV	1983–2014	District 5
NY	1987	Subdistrict 1B
OH	1983, 2011–2014	District 2
OK	1983–2014	District 2
OR	2011–2014	District 5
RI	2003, 2011–2014	Subdistrict 1A
SC	1983–2004, 2007–2014	Subdistrict 1C
	2005, 2006	District 1
SD	1983–2014	District 2
TN	1983–2014	District 2
TX	1983–2014	District 3
UT	1983–2014	District 4
VA	2014	Subdistrict 1C
VT	2011–2014	Subdistrict 1A
WI	2011–2014	District 2
WV	2011–2014	Subdistrict 1C
WY	1983–2014	District 4

the sectors' prices was applied to the 2000 commercial sector PAD District 4 price to derive an industrial sector PAD District 4 price.

Physical unit prices: 1982

In 1984, the U.S Census Bureau announced that state-level fuel cost and quantity information would no longer be published in either the *Annual Survey of Manufactures (ASM)* or *Census of Manufactures (CM)*. In addition, the *PMA*, the source for 1983 forward industrial sector distillate price data, did not contain 1982 prices. Because of this lack of price data, the 1982 industrial sector distillate prices are estimated on the basis of the relationship of industrial sector prices to electric power sector prices for 1978 through 1981. The 1983 prices are not used in the estimation because they exclude taxes, while the 1978 through 1981 prices include taxes.

1. In order to calculate the average ratios of industrial-to-electric power distillate prices, electric power sector price assignments are made for: AK in 1978 through 1982 from WA; ID in 1979 through 1982 from MT; RI in 1978 through 1982 from CT; and VT in 1978 from ME.
2. The average 1978 through 1981 ratios of industrial-to-electric power sector distillate prices are calculated for each state.
3. Prices for 1982 are estimated by multiplying the average ratios by the electric power data for 1982.

Physical unit prices: 1971, 1974 through 1981

For the years 1971 and 1974 through 1981, industrial sector distillate prices are calculated directly from cost and quantity data from the *Annual Survey of Manufactures (ASM)* or *Census of Manufactures (CM)* for all states where data are available. Taxes are included in the prices. There are no missing prices for 1971. Six states are missing some *ASM* cost and quantity data for the 1974 through 1981 period. Cost and quantity data for these states are estimated as the simple average of the cost and quantity data for their adjacent states. The states, the years for which data are estimated, and the adjacent states used to make the estimation are shown in Table TN4.7.

Physical unit prices: 1970, 1972, 1973

Since *ASM* and *CM* data are not available for these years, the prices must be estimated. Physical unit prices are based on the ratio of 1971 *CM* prices to the 1971-assigned *Platt's* prices (Table TN4.2 on page 38). The resulting ratios for each state are used with the *Platt's* assigned prices for 1970, 1972, and 1973 to impute prices.

1. The first step is to calculate state-level ratios between prices calculated

Table TN4.7. Distillate industrial sector price assignments, 1974 through 1981

State	Year	State prices used
HI	1979–1981	CA
ND	1979–1981	MN, MT, SD
NM	1974–1979	AZ, CO, TX
NV	1974–1981	AZ, CA, ID, OR, UT
OK	1974–1978	AR, CO, KS, MO, TX
WY	1974–1981	CO, ID, MT, NE, SD, UT

from the 1971 *CM* cost and quantity data and the 1971 assigned *Platt's* prices. There are no missing states in either of these two sets of prices.

2. State-level physical unit prices for 1970, 1972, and 1973 are estimated by multiplying the 1971 ratio by the assigned state-level *Platt's* prices for each respective year.

Btu prices: all years

Btu prices for states are calculated by converting the physical unit prices from dollars per gallon to dollars per barrel (42 gallons per barrel) and then to dollars per million Btu using the conversion factors calculated by EIA and presented in SEDS Consumption Technical Notes, Table B1. U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS, adjusted for process fuel consumption.

Data sources

Prices

2011 forward: Unpublished price data from EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report."

2010: EIA, Petroleum & Other Liquids data website, No. 2 Distillate Prices by Sales Type, http://www.eia.gov/dnav/pet/pet_pri_dist_a_EPD2_pin_dpgal_a.htm.

1983-2009: EIA, *Petroleum Marketing Annual 1985, Volume 1,* Table 25 (1983-1985), and annual issues of the *Petroleum Marketing Annual,* http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html, Table 36 (1986-1988), Table 38 (1989-1993), Table 39 (1994-2006), and Table 35 (2007-2009), column titled "Sales to End Users—Industrial Consumers."

1970-1982: McGraw-Hill, Inc., *Platt's Oil Price Handbook and Oilmanac,* refinery and terminal prices for No. 2 fuel oil, average of highs and lows.

1971, 1977, and 1981: Census Bureau, U.S. Department of Commerce, *Census of Manufactures,* Table 4 (1971) and Table 3 (1977, 1981).

1974-1976 and 1978-1980: Census Bureau, U.S. Department of Commerce, *Annual Survey of Manufactures,* Table 3.

Taxes

For 1992 forward, an annual average general sales tax is calculated for each State as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the state general sales tax as of September 1 of each year is used.

For 2009, the Federation of Tax Administrators did not publish state general sales tax data but did publish state general sales tax data for 2010. Therefore, the 2009 tax rates were estimated by comparing the Federation of Tax Administrators' 2008 and 2010 rates for each respective state. If no change occurred between 2008 and 2010, it has been assumed the rate remained constant in 2009. If a rate did change between those years, the State Department of Revenue was consulted to determine the effective date of the rate change to be used in the 2009 estimates accordingly.

1996 forward: Federation of Tax Administrators, http://www.taxadmin.org/current-tax-rates.

1995: The Council of State Governments, *The Book of the States 1994-95 and 1996-97,* Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism,* Tables 14 and 26.

1993: Census Bureau, U.S. Department of Commerce, *State Tax Review,* Volume 54, No. 31, map titled "State Gasoline, Sales and Cigarette Tax Rates as of July 1, 1993."

1983-1992: Census Bureau, U.S. Department of Commerce, *State Government Tax Collections,* table titled "State Government Excises on General Sales, Motor Fuel, and Cigarettes, Beginning and End of Fiscal Year," column "Percentage rate, Sept. 1."

Consumption

1970 forward: EIA, State Energy Data System, industrial sector distillate consumption.

Conversion factors: all years

1970 forward: EIA, State Energy Data System, Consumption Technical Notes,

Table B1.

Transportation sector

Consumption of distillate fuel oil in the transportation sector includes distillate fuel oil used for vessel bunkering and for military and railroad use, plus on-highway diesel fuel use. Because on-highway diesel fuel use accounts for the largest portion of this sector, prices and expenditures are calculated by using diesel fuel prices to end users through retail outlets. State physical unit prices for 1986 through 2009 are taken from the EIA *Petroleum Marketing Annual (PMA)*. For 2010, *PMA* is no longer available, but the same set of physical unit prices in dollars per gallon (excluding taxes) are available on the EIA website. For 2011 forward, state physical unit prices are estimated using regional-level regression equations (see below). Physical unit prices for earlier years are calculated by using *PMA* prices and consumption data from the U.S. Department of Transportation's *Highway Statistics* to weight monthly or quarterly prices from the U.S. Department of Agriculture's *Agricultural Prices* into annual prices.

The state and federal excise taxes on diesel fuel are added to *PMA* prices to derive final physical unit prices, which are converted to dollars per gallon. In cases where the tax rate is not constant throughout the year, an annual average tax is calculated on the basis of the number of months each rate was in effect. Due to the lack of uniformity in application, state and local sales and other general taxes are not included. Btu prices for all years are calculated by using the physical unit prices and the distillate conversion factor.

Physical unit prices: 2011 forward

The survey that provides reseller and retailer sales prices for distillate fuel oil by sales type, Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," was discontinued in 2011. As a result, data for distillate prices by sales type, which are based on survey forms EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," and EIA-782B are no longer available. To estimate transportation distillate fuel oil prices, regression equations are developed for each Petroleum Administration for Defense (PAD) district and subdistrict using historical refiner transportation sales prices for No. 2 diesel fuel from EIA-782A as the independent variable and the historical prices for transportation distillate prices as the dependent variable. These regression equations are used to estimate the current transportation distillate fuel oil prices for the PAD districts and subdistricts and for states that have historical refiner/reseller/retailer prices and sizable sales volume—AK, DE, ID, IL, IN, MA, MI, MN, NH, NJ, NY, OH, PA, RI, VA, WA, WI and WV, provided that they have refiner transportation prices. All other states are assigned the corresponding PAD district or subdistrict estimated price. For Hawaii (HI), where diesel prices are expected to be higher than the PAD District 5 averages, the transportation distillate fuel price is estimated by applying the percentage change of the estimated PAD District 5 price to the previous year's HI price. All price assignments are shown in Table TN4.8. State general sales taxes are added to the state estimated prices.

Physical unit prices: 2000 through 2010

Diesel fuel physical unit prices for 2000 through 2010 are based on the annual state-level price data available from the *PMA* and on the EIA website for approximately 23 states, and monthly tax rate information from the EIA *Petroleum Marketing Monthly (PMM)* for every state.

State and federal diesel tax rates are taken from Table EN1 of the EIA *PMM*. EIA updates this table twice a year, reporting the tax rates on January 1 and July 1. Changes to tax rates that occur in between those months will not be reflected until the next update. To compile the average tax rates for the year, information on the effective date of rate changes is collected from additional sources. These include State Department of Revenue offices, the U.S. Department of Defense, Defense Energy Support Center, annual report entitled *Compilation of United States Fuel Taxes, Inspection Fees and Environmental Taxes and Fees*, and the U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* report. They are combined with the federal tax rate to adjust the *PMA* prices.

For the remaining states for which no prices are published, the PAD district or subdistrict prices for diesel fuel and motor gasoline and state motor gasoline prices are used. The state diesel fuel price is estimated as the ratio of the PAD district or subdistrict diesel fuel price to the PAD district or subdistrict motor gasoline price times the state motor gasoline price. This assumes that the relationship between the state and PAD district or subdistrict prices for diesel fuel is similar to that of the state and PAD district or subdistrict prices for motor gasoline. The series for motor gasoline physical unit prices is based on the average annual sales prices (excluding taxes) of finished motor gasoline to end users through retail outlets contained in Table 28 of the *PMA* or at http://www.eia.gov/dnav/pet/pet_pri_allmg_a_EPM0_PTC_dpgal_a.htm. This series reflects data collected from refiners, resellers, and retailers in the industry, and provides more comprehensive coverage than the series previously used, which reflected data collected from refiners only. State and federal excise taxes are added as described above.

Physical unit prices: 1986 through 1999

Diesel fuel physical unit prices for 1986 through 1999 are based on the annual

Table TN4.8. Distillate fuel oil transportation sector PAD district and subdistrict price assignments, 2011 forward

State	Years	Assignments
AL	2011–2014	District 3
AR	2011–2014	District 3
AZ	2011–2014	District 5
CA	2011–2014	District 5
CO	2011–2014	District 4
CT	2011–2014	Subdistrict 1A
DC	2011–2014	Subdistrict 1B
FL	2011–2014	Subdistrict 1C
GA	2011–2014	Subdistrict 1C
HI	2011–2014	District 5 growth rate
IA	2011–2014	District 2
KS	2011–2014	District 2
KY	2011–2014	District 2
LA	2011–2014	District 3
MD	2011–2014	Subdistrict 1B
ME	2011–2014	Subdistrict 1A
MO	2011–2014	District 2
MS	2011–2014	District 3
MT	2011–2014	District 4
NC	2011–2014	Subdistrict 1C
ND	2011–2014	District 2
NE	2011–2014	District 2
NM	2011–2014	District 3
NV	2011–2014	District 5
OK	2011–2014	District 2
OR	2011–2014	District 5
SC	2011–2014	Subdistrict 1C
SD	2011–2014	District 2
TN	2011–2014	District 2
TX	2011–2014	District 3
UT	2011–2014	District 4
VT	2011–2014	Subdistrict 1A
WY	2011–2014	District 4

state-level price data available from the *PMA* for approximately 23 states and monthly tax rate information from *Highway Statistics*. State and federal excise taxes on diesel fuel are added to *PMA* prices to derive final physical unit prices.

For the remaining states for which no prices are published, the *PMA* PAD district or subdistrict prices for diesel fuel and motor gasoline and state motor gasoline prices are used. The state diesel fuel price is estimated as the ratio of the PAD district or subdistrict diesel fuel price to the PAD district or subdistrict motor gasoline price times the state motor gasoline price. Motor gasoline prices to end users at all refiners' company outlets are used. When a state has no price available in either data series, the motor gasoline price to end users by all types of sellers through company outlets is used as the state motor gasoline price. The District of Columbia has no published diesel fuel or motor gasoline prices for 1991-1999, 2001, and 2003 forward and is assigned the Maryland diesel fuel price. State and federal excise taxes are added as described above.

Physical unit prices: 1983 through 1985

Diesel fuel physical unit prices for 1983 through 1985 are based on the annual state-level price data available from the *PMA* and monthly state and federal tax rate information from *Highway Statistics* for 24 states. The prices for the remaining 27 states are calculated by using *Agricultural Prices* as outlined in the 1977 through 1982 methodology.

The *PMA* provides physical unit prices for approximately 24 states, excluding taxes. In 1983 through 1985, the DC price is missing, and the MD price is assigned. In 1983, RI has no price and the PAD Subdistrict 1A average is assigned. A simple average of monthly state and federal excise taxes is calculated as a combined average tax and added to the *PMA* price for a final physical unit price. State and local sales and other general taxes are not included.

Physical unit prices: 1977 through 1982

Monthly prices from *Agricultural Prices* and monthly special fuels consumption data from *Highway Statistics* are collected for the states. MD prices are assigned to DC. Prices include state and local per-gallon taxes. Federal taxes and state and local sales and other general taxes are not included.

The volume-weighted annual diesel physical unit prices for states and the United States are calculated by using the monthly *Agricultural Prices* price data, weighted by the monthly *Highway Statistics* consumption data. The AK 1977 through 1982 prices are estimated on the basis of the assumption that the ratio of AK-to-U.S. diesel fuel price is the same as the ratio of the AK-to-U.S. motor gasoline price each year.

Physical unit prices: 1970 through 1976

Quarterly prices from *Agricultural Prices* and monthly special fuels consumption data from *Highway Statistics* are collected for the states. Prices include state

and local per-gallon taxes. Federal taxes and state and local sales taxes and other general taxes are not included.

1. Prices for 1970 through 1972 are reported in cents per gallon and must be converted to dollars per gallon. Prices for 1973 through 1976 are already reported in dollars per gallon.
2. For 1971 through 1973, state-level prices are not available for CT, MA, ME, NH, RI, and VT. Each is assigned the New England regional price for the 3 years.
3. The third quarter DE price is assigned to the missing fourth quarter DE price in 1972.
4. The combined MD/DE prices reported in 1973 are assigned to each of the states.
5. For 1970 through 1976, MD (or MD/DE) prices are assigned to DC.

The monthly special fuels consumption for 1970 through 1976 are converted into quarterly consumption by summing the months for each quarter.

The consumption-weighted annual diesel physical unit prices for the states are calculated by using the quarterly weights and quarterly prices.

For 1970 through 1972, the quarterly prices from *Agriculture Prices* are converted from cents per gallon to dollars per gallon. For 1973 forward, the prices are already in dollars per gallon in the source. AK/1970 through 1976 prices are estimated on the basis of the assumption that the ratio of AK-to-U.S. diesel fuel price is the same as the ratio of AK-to-U.S. motor gasoline price each year.

Btu prices: all years

Btu prices for states are calculated by converting the physical unit prices from dollars per gallon to dollars per barrel (42 gallons per barrel) and then to dollars per million Btu using the conversion factors calculated by EIA and presented in SEDS Consumption Technical Notes, Table B1. U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption from SEDS.

Data sources

Prices

2011 forward: Unpublished price data from EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report."

2010: EIA, Petroleum & Other Liquids data website, No. 2 Distillate Prices by Sales Type, http://www.eia.gov/dnav/pet/pet_pri_dist_a_EPD2_PTC_dpgal_a.htm.

1986-2009: EIA, *Petroleum Marketing Annual,* http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html, Table 36 (1986-1988), Table 38 (1989-1993), column titled "Sales to End Users, Through Company-Operated Retail Outlets," Table 40 (1994-2006), and Table 36 (2007 forward), column titled "Sales to End Users, Through Retail Outlets," for diesel fuel prices.

2000-2008: EIA, *Petroleum Marketing Annual*, Table 31 (2000-2006), and Table 28 (2007-2009), column titled "All Grades, Sales to End Users, Through Retail Outlets," and EIA website at http://www.eia.gov/dnav/pet/pet_pri_allmg_a_EPM0_PTC_dpgal_a.htm, for refiner/reseller/retailer motor gasoline prices.

1986-1999: EIA, *Petroleum Marketing Annual*, Table 29 (1986-1988) and Table 30 (1989-1993), column titled "All Refiners, Sales to End Users, Through Company Outlets," Table 35 (1994-1999), column titled "All Grades, Sales to End Users, Through Retail Outlets," for refiner motor gasoline prices.

1983-1985: EIA, *Petroleum Marketing Annual 1985*, Volume 1, Table 25, column titled "Sales to End Users, Sales Through Company-Operated Retail Outlets."

1970-1985: Crop Reporting Board, U.S. Department of Agriculture, Agriculture Prices, tables generally titled "Motor Supplies: Average Price Paid by Farmers for Motor Fuel" for 1970-1979, and "Diesel Fuel: Average Price Paid by States" for 1980-1985.

1970-1985: Federal Highway Administration, U.S. Department of Transportation, *Highway Statistics*, Table MF-25 for special fuels consumption data. Table MF-25 is not included in the 1976 volume but is publicly available directly from the Federal Highway Administration.

Taxes

2000 forward (State Taxes): EIA, *Petroleum Marketing Monthly,* http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_marketing_monthly/pmm.html, Table EN1, column titled "Diesel Fuel," supplemented with information from state revenue offices and the Federal Highway Administration, U.S. Department of Transportation, *Highway Statistics,* http://www.fhwa.dot.gov/policyinformation/statistics.cfm, Table MF-121T.

1970-1999: Federal Highway Administration, U.S. Department of Transportation, *Highway Statistics*, Table MF-121T for state tax rates, supplemented with information from state revenue offices. Federal taxes are from *Highway Statistics* Table FE-101 (1970 through 1992) and Table MF-121T (1993 forward).

Consumption

1970 forward: EIA, State Energy Data System, transportation sector distillate consumption.

Conversion factors: all years

1970 forward: EIA, State Energy Data System, Consumption Technical Notes, Table B1.

Jet Fuel

Jet fuel prices are estimated for all years in the transportation sector and for 1972 through 1982 in the electric power sector.

Transportation sector

Prices are developed for kerosene-type jet fuel in the State Energy Data System (SEDS) and are used as the price for both kerosene and naphtha-type jet fuels. Since 1997, virtually all jet fuel used for transportation is kerosene-type. Taxes are not included in the prices.

Physical unit prices: 1983 forward

Transportation sector jet fuel prices for 1983 forward are based on data from U.S. Energy Information Administration (EIA)'s *Petroleum Marketing Annual* and *Petroleum Marketing Monthly*. Annual refiner prices of sales to end users are available for most states. Prices are converted to dollars per gallon. States without prices are assigned adjacent state or PAD district or subdistrict prices, as shown in Table TN4.9.

Physical unit prices: 1976 through 1982

State-level jet fuel prices for 1976 through 1982 are calculated from the *Producer Prices and Price Indexes (PPI)* monthly indices for Census divisions and the jet fuel base prices by state for July 1975. The monthly price for each Census division is equal to the *PPI* monthly index times the jet fuel base price for July 1975 for that Census division. Census division monthly prices are assigned to each state within the Census division, and annual jet fuel prices are computed as simple averages of the monthly state prices.

Physical unit prices: 1970 through 1975

Jet fuel physical unit state-level prices for the 1970 through 1975 period are based on U.S. annual wholesale prices from the *PPI* and the relationship of these prices to wholesale kerosene prices reported in *Platt's.* The U.S. prices are converted to Census division prices, which are then assigned directly to states.

Preliminary U.S. jet fuel prices from the *PPI* for 1973 through 1980 are calculated by using the annual jet fuel price indices, the jet fuel U.S. base price for July 1975 (0.276 dollars per gallon) and the U.S. index for July 1975 (235.8). The index for 1973 is assumed to be equal to a simple average of the 11 available monthly indices.

Table TN4.9. Jet fuel transportation sector price assignments, 1983 forward

State	Years	Assignment
AR	2001–2003, 2007–2014	PAD District 3
CT	2008–2014	PAD Subdistrict 1A
DC	1983–1988, 1990, 1993, 1995, 1997, 1998,	MD
DE	1987, 2003–2014	PAD Subdistrict 1B
HI	2000–2012	PAD District 5
ID	2007–2011, 2014	PAD District 4
KS	1996, 2006–2014	PAD District 2
KY	2006–2008, 2014	PAD District 2
MA	1996, 2003–2010, 2013, 2014	PAD Subdistrict 1A
MD	2012, 2014	PAD Subdistrict 1B
ME	1985, 1990, 1991, 1993–2014	PAD Subdistrict 1A
MO	2007, 2010, 2013, 2014	PAD District 2
MS	2002, 2007, 2009–2012	PAD District 3
MT	2009–2011, 2013, 2014	PAD District 4
NC	2014	PAD Subdistrict 1C
ND	2002–2014	PAD District 2
NE	2004, 2006, 2007, 2012–2014	PAD District 2
NH	1987, 1995, 2000, 2004–2014	PAD Subdistrict 1A
NM	2007, 2008, 2012–2014	PAD District 3
NY	2014	PAD Subdistrict 1B
RI	1983–1988, 1998–2000, 2002–2014	PAD Subdistrict 1A
SC	2014	PAD District 1C
SD	2009–2011, 2013	PAD District 2
TN	2009–2014	PAD District 2
VT	1984–1988, 1991, 1992, 1999, 2003–2014	PAD Subdistrict 1A
WI	2003, 2008–2014	PAD District 2
WV	1993–2000, 2003–2010, 2012–2014	PAD District 1C
WY	2003, 2005–2007, 2009–2014	PAD District 4

The calculated preliminary U.S. jet fuel prices from the *PPI* are used as the dependent variable in a regression equation for 1973 through 1980, where the wholesale kerosene prices from *Platt's* are the independent variable. The regression equation is used to estimate U.S. annual jet fuel prices for 1970 through 1972.

Jet fuel prices for Census divisions are estimated by using the preliminary U.S. prices derived above for 1970 through 1975 (calculated directly from the *PPI* data for 1973 through 1975 and estimated for 1970 through 1972). These prices are used as inputs to a regression equation which establishes a linear relationship between preliminary U.S. prices and Census division prices for the years 1970 through 1975. Census division prices are assigned to each state within the Census division.

Btu prices: all years

Btu prices for states are calculated from the physical unit prices and the Btu conversion factor (5.670 million Btu per barrel). U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

2010 forward: EIA, Petroleum & Other Liquids data website, Refiner Petroleum Product Prices by Sales Type, End Users—Kerosene-type Jet Fuel, http://www.eia.gov/dnav/pet/pet_pri_refoth_a_EPJK_PTG_dpgal_a.htm.

1985-2009: EIA, *Petroleum Marketing Annual,* http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html, Table 21, column titled "Kerosene-Type Jet Fuel" (1985), Table 33, column titled "Kerosene-Type Jet Fuel, Sales to End Users," (1986-1988), Table 35 (1989-1993), Table 36 (1994-2006), and Table 32 (2007 forward). Also available at http://www.eia.gov/dnav/pet/pet_pri_refoth_a_EPJK_PTG_dpgal_a.htm.

1983, 1984: EIA, *Petroleum Marketing Annual 1994*, Table A2, column titled "Kerosene-Type Jet Fuel, Sales to End Users."

1973-1982: Bureau of Labor Statistics, U.S. Department of Labor, *Producer Prices and Price Indexes, Supplement,* table titled "Producer price indexes for refined petroleum products by region."

1970-1975: McGraw-Hill, Inc., *Platt's Oil Price Handbook and Oilmanac,* 57th Edition, page 480.

Consumption

1970 forward: EIA, State Energy Data System, transportation sector jet fuel consumption.

Conversion factor: all years

5.670 million Btu per barrel.

Electric power sector

Jet fuel electric power consumption estimates are available in SEDS for 1972 through 1982 only. For 1970 and 1971, no parallel series is available; and for the years after 1982, the series is a part of "light oil" and assigned the electric power distillate fuel oil price by state. (See Distillate Fuel Oil, Electric Power Sector on page 43). All applicable taxes are included in the prices.

Btu prices: 1975 through 1982

For the states that consumed kerosene-type jet fuel at electric utilities during these years, the Btu prices are taken directly from EIA's *Cost and Quality of Fuels for Electric Plants (C&Q).*

Btu prices: 1972 through 1974

Because *C&Q* prices are not available for 1972 through 1974, prices are estimated from *C&Q* prices for 1975 and 1976 and the U.S. Department of Agriculture's *Agricultural Prices* data for 1972 through 1976.

1. Simple annual averages of *Agricultural Prices* quarterly values are calculated for 1972 through 1976. New England Census Division prices are assigned to CT, MA, ME, NH, RI, and VT.
2. The average annual prices based on *Agricultural Prices* values for 1975 and 1976 are used as the independent variables in a regression where the dependent variables are state-level prices based on *C&Q* prices for 1975 and 1976.
3. State-level price estimates for 1972 through 1974 are derived from the results of the regression analysis and the *Agricultural Prices* values for 1972 through 1974.

U.S. Btu prices: all years

U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

1975-1982: EIA, *Cost and Quality of Fuels for Electric Plants*, Tables 6 and 13 (1975), Table 13 (1976-1979), and Table 47 (1980-1982).

1972-1976: Crop Reporting Board, U.S. Department of Agriculture, *Agriculture Prices*, table titled "Household Supplies: Average Prices Paid by Farmers for Lawn Mowers and Petroleum Products."

Consumption

1972-1982: EIA, State Energy Data System, electric power sector kerosene-type jet fuel consumption.

Conversion factors: all years

Because Btu prices are available directly from the data sources, no conversion factors are used.

Kerosene

Kerosene prices are developed for the residential, commercial, and industrial sectors. For 1970 through 1982, prices are developed for the residential and industrial sectors, and the industrial sector prices are assigned to the commercial sector. For 1983 forward, end-user prices are used for the residential and commercial sectors and prices of kerosene sold for resale are used for the industrial sector. Estimates of the amount of kerosene consumed by the residential, commercial, and industrial sectors are taken from the State Energy Data System (SEDS).

Residential sector

Residential sector kerosene prices are estimated by using several data sources and estimation methodologies, depending on the year. For 1983 through 2009, prices of kerosene sales to end users (excluding taxes) are taken from the U.S. Energy Information Administration's (EIA) *Petroleum Marketing Annual (PMA).* For 2010 forward, *PMA* is no longer available, but the same set of physical unit prices in dollars per gallon (excluding taxes) are available on the EIA website. State general sales taxes from the U.S Census Bureau and successor sources are added. For 1970 through 1982, residential kerosene prices are developed from the U.S. Bureau of Labor Statistics *Producer Prices and Price Indexes (PPI)* data series and the U.S. Department of Agriculture *Agricultural Prices* for kerosene. For all years, physical unit prices are calculated from the data sources, and Btu prices are computed by using the physical unit prices and the conversion factor.

Physical unit prices: 1983 forward

Prices of kerosene sold to end users, published in the EIA *PMA* and/or available on the EIA website ae used as residential sector prices. The prices, in dollars or cents per gallon (excluding taxes) are available for as few as 1 or as many as 30 states, depending on the year. States with residential kerosene consumption, but no published prices, are assigned their Petroleum Administration for Defense (PAD) district or subdistrict prices as shown in Table TN4.10.

In 1990 and 1991, the PAD District 4 prices of kerosene sold to end users are out-of-range. In 1990, the ratio between the 1989 PAD District 4 end-user price and the U.S. end-user price is applied to the 1990 U.S. end-user price to estimate the PAD District 4 end-user price. Similarly, in 1991, the ratio between the 1992 PAD District 4 end-user price and the U.S. end-user price is applied to the 1991 U.S. end-user price to estimate the PAD District 4 end-user price.

For 1998 through 2002, the PAD District 4 prices of kerosene sold to end users are withheld. The average of the ratios between the end-user price of kerosene and the price of kerosene sold for resale in PAD Subdistricts 1A through 1C and PAD District 2 is applied to the PAD District 4 sales for resale price to estimate the PAD District 4 end-user price for each year.

In 2003, the PAD District 3, 4, and 5 prices of kerosene sold to end users are withheld. For PAD Districts 3 and 4, the average of the ratios between the end-user price and the sales for resale price in PAD Subdistricts 1A through 1C and PAD District 2 is applied to the PAD Districts 3 and 4 resale prices to estimate their end-user prices. The PAD District 5 end-user price is assigned the average of the District's end-user prices in 2001 and 2002.

For 2004 through 2006, only PAD District 1, Subdistrict 1B, and Subdistrict 1C end-user prices for kerosene are available. For PAD Subdistrict 1A, the PAD District 1 end-user prices are assigned. For the other PAD districts, the average of the ratios between the end-user price and the sales for resale price in PAD Subdistricts 1B and 1C is applied to the missing districts' resale prices to estimate their end-user prices for each year.

For 2007 forward, the end-user prices for kerosene are only available for PAD District 1, Subdistricts 1B and 1C, and for PAD District 3 (2007) and Subdistrict 1A (2007-2009). When PAD Subdistrict 1A price is not available, the PAD District 1 end-user price is assigned. In 2014, end-user price for Subdistrict 1C is also withheld. It is estimated using the 2014 growth rate of the District 1 end-user price. For the other missing PAD end-user prices, the average of the ratios between end-user prices and the sales for resale prices in PAD Subdistricts 1B and 1C is applied to the missing districts' sales for resale prices to estimate their end-user prices. However, the sales for resale prices for PAD Districts 4 and 5 are also withheld for 2007 forward (except for 2011 District 4 price). In these instances, the year-on-year percentage increase of the U.S. sales for resale prices are applied to the previous year's sales for resale prices of the missing districts. The resulting estimates are then used to calculate the districts' end-user price.

Once missing prices have been assigned, state general sales taxes are then added.

Physical unit prices: 1977 through 1982

Monthly Census division prices and price indices from the Bureau of Labor Statistics *PPI* are used as the basis for the residential kerosene series from 1977 through 1982. To maintain consistency in the agricultural price series used for 1970 through 1976, the *PPI* prices are multiplied by an adjustment factor that accounts for the relationship between *PPI* and *Agricultural Prices* data for

Table TN4.10. Kerosene residential and commercial sectors PAD district and subdistrict price assignments, 1983 forward

State	Years	Assignments	State	Years	Assignments
AK	1983–2014	District 5	MT	1983–2014	District 4
AL	1986, 1991, 1993, 1996, 1997, 2002–2014	District 3	NC	2006–2014	Subdistrict 1C
AR	1984, 1986–2014	District 3	ND	1983–2014	District 2
AZ	1983–2014	District 5	NE	1983–2014	District 2
CA	1983–2014	District 5	NH	1983, 1984, 1986–1995, 1997, 1998,	Subdistrict 1A
CO	1985–2014	District 4		2001–2014	
CT	1983, 1987–1992, 1994–2014	Subdistrict 1A	NJ	1983, 1984, 1987, 1989, 1994, 1996–1998,	Subdistrict 1B
DC	1983–2005	Subdistrict 1B		2002–2014	
DE	1991–2014	Subdistrict 1B	NM	1983, 1985, 1987–2014	District 3
FL	1985, 2005, 2008–2014	Subdistrict 1C	NV	1983–2014	District 5
GA	1993, 2000, 2004–2014	Subdistrict 1C	NY	2013, 2014	Subdistrict 1B
HI	1983–2014	District 5	OH	2004, 2006, 2008–2014	District 2
IA	1983–2014	District 2	OK	1983, 1987–1998, 2000–2014	District 2
ID	1983–2014	District 4	OR	1983–2014	District 5
IL	1987, 2000, 2003–2014	District 2	RI	1983, 1988–1992, 1994–2014	Subdistrict 1A
IN	1996, 1997, 1999–2014	District 2	SC	1993, 2004, 2006–2014	Subdistrict 1C
KS	1983–2014	District 2	SD	1983–2014	District 2
KY	1983, 1999–2014	District 2	TN	2004–2014	District 2
LA	1991–2000, 2004–2014	District 3	TX	1993–1996, 1998, 1999, 2002–2014	District 3
MA	2002, 2004–2006, 2012, 2014	Subdistrict 1A	UT	1983–2014	District 4
MD	1998–2014	Subdistrict 1B	VA	2000, 2006–2014	Subdistrict 1C
ME	1986–2014	Subdistrict 1A	VT	1984, 1985, 1989–1998, 2000–2014	Subdistrict 1A
MI	1993, 2004–2014	District 2	WA	1983–2014	District 5
MN	1983, 1985, 1990, 1992–1998, 2000–2014	District 2	WI	1983–1997, 1999–2014	District 2
MO	1987–1989, 1991–2014	District 2	WV	2006–2014	Subdistrict 1C
MS	1988, 1989, 1991–2014	District 3	WY	1983–2014	District 4

quarters in which the two series overlap. In the description of computational procedures below, the adjustment factor is derived first, the PPI prices for 1977 through 1982 are estimated, and the final kerosene physical unit and Btu prices for states are calculated. The final residential sector kerosene prices approximate the average prices paid by farmers. Taxes are included in the source data from *Agricultural Prices* and are, therefore, reflected in the final price estimates.

The first step is to compute the adjustment factor relating *PPI* and *Agricultural Prices* data.

1. Monthly *PPI* prices for the 18 months covered from July 1975 through December 1976 are calculated from the July 1975 base prices and monthly indices for Census divisions.
2. The calculated Census division monthly prices are assigned to each state within the respective Census division.
3. Volume-weighted quarterly *PPI*-based prices for states are calculated by using the monthly volume weights developed from *Retail Sales and Inventories* sales data for "other distillate fuel oil."
4. The adjustment factor relating *PPI and Agricultural Prices* data is calculated as the simple average of the ratios of the quarterly kerosene price by state from *Agricultural Prices* to the calculated quarterly *PPI*-based kerosene prices by state.

The next step is the calculation of monthly state-level prices from *PPI* kerosene Census division data for 1977 through 1982.

1. Monthly Census division *PPI* prices are calculated by using the July 1975

base prices and the monthly price indices for 1977 through 1982. The missing monthly indices for February, June, July, and October 1980 for the East South Central Division are assumed to be equal to the index for the preceding month.

2. Each state is assigned its respective Census division monthly prices.

The next step is the calculation of annual physical unit state prices.

1. Annual *PPI*-based physical unit prices for states are computed from the monthly *PPI* prices and the monthly consumption weights.
2. Final residential kerosene prices for states are estimated as the product of the annual *PPI*-based state price and the adjustment factor calculated above.

Physical unit prices: 1970 through 1976

Physical unit prices for states are calculated from quarterly price data from the U.S. Department of Agriculture's *Agricultural Prices* and consumption weights derived from EIA's *Retail Sales and Inventories of Fuel Oil*. Taxes are included in the source data.

The quarterly physical unit price data from *Agricultural Prices* for 1970 through 1976 are published in several different forms. The first step in the calculation of prices for these years is to organize the published *Agricultural Prices* data into a consistent form.

1. For 1971 through 1973, no quarterly prices are available for CT, MA, ME, NH, RI, and VT. Each of these states is assigned the quarterly prices reported for the New England Census Division.
2. For 1973, combined MD/DE quarterly prices are reported instead of separate state prices. For this year, the combined prices are assigned to both states.
3. No prices are reported for AK and DC for 1970 through 1976. Quarterly weighted Census division prices are assigned to AK, and MD prices are assigned to DC for these years.

In order to weight the quarterly prices from *Agricultural Prices* into annual state prices, monthly quantity weights are calculated from *Retail Sales and Inventories of Fuel Oil*. This assumes that the "other distillate oil" consumption data by PAD districts or subdistricts is kerosene.

1. Monthly weights are computed by using simple averaging of all available "other distillate oil" sales data for each month for each PAD district or subdistrict. Since data are available from November 1978 to March 1981, some months have averages based on three data points, while others are based on one or two data points. For example, the average weight for March is the simple average of the 1979, 1980, and 1981 March volumes published in *Retail Sales and Inventories of Fuel Oil*.
2. Each month's share of average annual sales is calculated by PAD district or subdistrict from the average monthly sales figures. These shares, which become the monthly weights, are then assigned to each state within its respective district or subdistrict.

Final state annual kerosene physical unit prices are calculated as the weighted average of the *Agricultural Prices* quarterly prices. The monthly weights (shares) are converted to quarterly weights by summing the shares for months within a particular quarter. These same weights are used with the state-level price data for each year from 1970 to 1976.

Alaska Btu prices: 1970 through 1979

Kerosene residential prices for AK are estimated on the basis of the assumption that the ratio of AK-to-U.S. kerosene residential prices is the same as the ratio of AK-to-U.S. distillate fuel oil residential prices.

Btu prices: all years

Btu prices for states are computed by converting the physical unit prices in dollars per gallon to dollars per barrel (42 gallons per barrel) and then to dollars per million Btu (5.670 million Btu per barrel). U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

2010 forward: EIA, Petroleum & Other Liquids data website, Refiner Petroleum Product Prices by Sales Type, End Users—Kerosene, http://www.eia.gov/dnav/pet/pet_pri_refoth_a_EPPK_PWG_dpgal_m.htm.

1983-2009: EIA, *Petroleum Marketing Annual,* also available at http://www.eia.gov/dnav/pet/pet_pri_refoth_a_EPPK_PWG_dpgal_m.htm, select Excel file labled "Download Series History."

1975-1982: Bureau of Labor Statistics, U.S. Department of Labor, *Producer Prices and Price Indexes, Supplement,* table titled "Producer price indexes for refined petroleum products by region."

1978-1981: EIA, *Retail Sales and Inventories of Fuel Oil,* Table 2.

1970-1976: Crop Reporting Board, U.S. Department of Agriculture, *Agricultural Prices*, table titled "Household Supplies: Average Price Paid by Farmers for Lawn Mowers and Petroleum Products."

Taxes

For 1992 forward, an annual average general sales tax is calculated for each state as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the state general sales tax as of September 1 of each year is used.

For 2009, the Federation of Tax Administrators did not publish state general sales tax data, but did publish state general sales tax data for 2010.

Therefore, the 2009 tax rates were estimated by comparing the Federation of Tax Administrators' 2008 and 2010 rates for each respective state. If no change occurred between 2008 and 2010, it has been assumed the rate remained constant in 2009. If a rate did change between those years, the State Department of Revenue was consulted to determine the effective date of the rate change to be used in the 2009 estimates accordingly.

1996 forward: Federation of Tax Administrators, http://www.taxadmin.org/current-tax-rates.

1995: The Council of State Governments, *The Book of the States 1994-95* and *1996-97,* Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism,* Tables 14 and 26.

1993: Census Bureau, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled "State Gasoline, Sales and Cigarette Tax Rates as of July 1, 1993."

1983-1992: Census Bureau, U.S. Department of Commerce, *State Government Tax Collections*, table titled "State Government Excises on General Sales, Motor Fuel, and Cigarettes, Beginning and End of Fiscal Year," column "Percentage rate, Sept. 1."

Consumption

1970 forward: EIA, State Energy Data System, residential sector kerosene consumption.

Conversion factor: all years

5.670 million Btu per barrel.

Commercial sector

Commercial sector kerosene prices are estimated by using different data sources and estimation methodologies, depending on the year. For 1983 through 2009, prices of kerosene sales to end users (excluding taxes) are taken from the EIA *Petroleum Marketing Annual (PMA).* For 2010 forward, *PMA* is no longer available, but the same set of physical unit prices in dollars per gallon (excluding taxes) are available on the EIA website. State general sales taxes from the U.S. Census Bureau and successor sources are added. For 1970 through 1982, prices for the industrial sector are assigned to the commercial sector.

Physical unit prices: 1983 forward

Prices of kerosene sold to end users, published in the EIA *PMA,* are used as commercial sector prices. The prices, in dollars or cents per gallon (excluding taxes) are available for as few as 1 or as many as 30 states, depending on the year. States with commercial kerosene consumption, but no *PMA* published prices, are assigned their Petroleum Administration for Defense (PAD) district or subdistrict prices as shown in Table TN4.10.

In 1990 and 1991, the PAD District 4 prices of kerosene sold to end users are out-of-range. In 1990, the ratio between the 1989 PAD District 4 end-user price and the U.S. end-user price is applied to the 1990 U.S. end-user price to estimate the PAD District 4 end-user price. Similarly, in 1991, the ratio between the 1992 PAD District 4 end-user price and the U.S. end-user price is applied to the 1991 U.S. end-user price to estimate the PAD District 4 end-user price.

For 1998 through 2002, the PAD District 4 prices of kerosene sold to end users are withheld. The average of the ratios between the end-user price of kerosene and the price of kerosene sold for resale in PAD Subdistricts 1A through 1C and PAD District 2 is applied to the PAD District 4 sales for resale price to estimate the PAD District 4 end-user price for each year.

In 2003, the PAD District 3, 4, and 5 prices of kerosene sold to end users are withheld. For PAD Districts 3 and 4, the average of the ratios between the end-user price and the sales for resale price in PAD Subdistricts 1A through 1C and PAD District 2 is applied to the PAD Districts 3 and 4 resale prices to estimate their end-user prices. The PAD District 5 end-user price is assigned the average of the District's end-user prices in 2001 and 2002.

For 2004 through 2006, only PAD District 1, Subdistrict 1B, and Subdistrict 1C end-user prices are available. For PAD Subdistrict 1A, the PAD District 1 end-user prices are assigned. For the other PAD districts, the average of the ratios between the end-user price and the sales for resale price in PAD Subdistricts 1B and 1C is applied to the districts' sales for resale prices to estimate their end-user prices for each year.

For 2007 forward, the end-user prices for kerosene are only available for PAD District 1, Subdistricts 1B and 1C, and for PAD District 3 (2007) and Subdistrict

1A (2007-2009). When PAD Subdistrict 1A price is not available, the PAD District 1 end-user price is assigned. In 2014, end-user price for Subdistrict 1C is also withheld. It is estimated using the 2014 growth rate of the District 1 end-user price. For the other missing PAD end-user prices, the average of the ratios between end-user prices and the sales for resale prices in PAD Subdistricts 1B and 1C is applied to the missing districts' sales for resale prices to estimate their end-user prices. However, the sales for resale prices for PAD Districts 4 and 5 are also withheld for 2007 forward (except for 2011 District 4 price). In these instances, the year-on-year percentage increase of the U.S. sales for resale prices are applied to the previous year's sales for resale prices of the missing districts. The resulting estimates are then used to calculate the districts' end-user prices.

Once missing prices have been assigned, state general sales taxes are then added.

Physical unit prices: 1970 through 1982

For 1970 through 1982, state prices for kerosene sold to the industrial sector are assigned to the commercial sector.

Btu prices: all years

Btu prices for states are computed by converting the physical unit prices in dollars per gallon to dollars per barrel (42 gallons per barrel) and then to dollars per million Btu (5.670 million Btu per barrel). U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

2010 forward: EIA, Petroleum & Other Liquids data website, Refiner Petroleum Product Prices by Sales Type, End Users—Kerosene, http://www.eia.gov/dnav/pet/pet_pri_refoth_a_EPPK_PWG_dpgal_m.htm.

1983-2009: EIA *Petroleum Marketing Annual,* also available at http://www.eia.gov/dnav/pet/pet_pri_refoth_a_EPPK_PWG_dpgal_m.htm, select Excel file labled "Download Series History."

1970-1982: Industrial sector kerosene prices from SEDS.

Taxes

For 1992 forward, an annual average general sales tax is calculated for each state as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the state general sales tax as of September 1 of each year is used.

For 2009, the Federation of Tax Administrators did not publish state general sales tax data, but did publish state general sales tax data for 2010. Therefore, the 2009 tax rates were estimated by comparing the Federation of Tax Administrators' 2008 and 2010 rates for each respective state. If no change occurred between 2008 and 2010, it has been assumed the rate remained constant in 2009. If a rate did change between those years, the State Department of Revenue was consulted to determine the effective date of the rate change to be used in the 2009 estimates accordingly.

1996 forward: Federation of Tax Administrators, http://www.taxadmin.org/current-tax-rates.

1995: The Council of State Governments, *The Book of the States 1994-95* and *1996-97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism*, Tables 14 and 26.

1993: Census Bureau, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled "State Gasoline, Sales and Cigarette Tax Rates as of July 1, 1993."

1983-1992: Census Bureau, U.S. Department of Commerce, *State Government Tax Collections*, table titled "State Government Excises on General Sales, Motor Fuel, and Cigarettes, Beginning and End of Fiscal Year," column "Percentage rate, Sept. 1."

Consumption

1970 forward: EIA, State Energy Data System, commercial sector kerosene consumption.

Conversion factor: all years

5.670 million Btu per barrel.

Industrial sector

Industrial sector kerosene prices are estimated by using different data sources and estimation methodologies, depending on the year. For 1983 through 2009, prices of kerosene sold for resale (excluding taxes) are taken from the EIA *PMA*. For 2010 forward, *PMA* is no longer available, but the same set of physical unit prices in dollars per gallon (excluding taxes) are available on the EIA website. State general sales taxes from the U.S. Census Bureau and successor sources are added.

For 1970 through 1982, the industrial sector kerosene prices are based on wholesale price and price index data and on the industrial sector distillate prices. The procedures vary slightly for 1970 through 1974 and 1975 through 1982. For 1970 through 1982, physical unit prices are calculated first; then Btu prices are computed by using the physical unit prices and the conversion factor. Prices approximate an average kerosene price for the manufacturing sector. Taxes are included in the distillate fuel oil prices and are, therefore, reflected in the kerosene price estimates.

Physical unit prices: 1983 forward

Prices of kerosene sold for resale are used as industrial sector kerosene prices. The prices, in dollars or cents per gallon (excluding taxes) are generally available for 9 to over 30 states depending on the year. States with industrial kerosene consumption, but no *PMA* published price are assigned their Petroleum Administration for Defense (PAD) district or sub-district price as shown in Table TN4.11. In 2003, the PAD District 5 sales for resale price is withheld and is assigned the average of the 2001, 2002, and 2004 PAD District 5 sales for resale prices. For 2007 forward, withheld sales for resale prices for PAD District 4 (2007-2010 and 2012 forward) and District 5 (2007 forward) are estimated by applying the year-on-year percentage increases of the U.S. sales for resale prices to the previous year's sales for resale prices for the missing districts. Withheld sales for resale prices for PAD Subdistrict 1A (2008, 2010, and 2012 forward) are estimated by applying the year-on-year percentage increase of the PAD District 1 sales for resale price to the previous year's sales for resale price of the missing district. State general sales taxes are then added.

Physical unit prices: 1975 through 1982

Physical unit industrial kerosene prices for 1975 through 1982 are estimated from the Bureau of Labor Statistics *Producer Prices and Price Indexes (PPI)* base prices and indices for kerosene and No. 2 distillate oil and from the industrial sector distillate prices in physical units. The ratio of *PPI* kerosene prices to *PPI* distillate prices is used as an adjustment factor to estimate kerosene prices.

Annual wholesale prices are calculated from *PPI* annual indices for kerosene and No. 2 distillate fuel oil and their respective July 1975 base prices for Census divisions. Annual average distillate price indices for 1976 are estimated as the simple average of monthly indices. Census division prices for both kerosene and fuel oil No. 2 are assigned to each state within the respective Census divisions. The industrial sector physical unit kerosene prices for states are computed by using the distillate industrial physical unit prices and the ratio of *PPI* kerosene prices to *PPI* fuel oil No. 2 prices.

Table TN4.11. Kerosene industrial sector PAD district and subdistrict price assignments, 1983 forward

State	Years	Assignments
AK	1983–2014	District 5
AL	2007, 2012–2014	District 3
AR	1997, 1998, 2002, 2006–2014	District 3
AZ	1983–2014	District 5
CA	1992, 1993, 2002, 2003, 2005–2014	District 5
CO	1985–1997, 1999–2000, 2006–2014	District 4
CT	1995, 1998, 1999–2000, 2006, 2010–2014	Subdistrict 1A
DC	1983, 1986, 1988, 1991, 1996, 1997, 1999	Subdistrict 1B
DE	1995–1998, 2003–2014	Subdistrict 1B
FL	2006–2014	Subdistrict 1C
GA	2009, 2010, 2012–2014	Subdistrict 1C
HI	1983–2014	District 5
IA	2008, 2010–2014	District 2
ID	1983–1997, 1999–2014	District 4
IL	2008, 2012–2014	District 2
IN	2009, 2012, 2014	District 2
KS	2007–2009, 2012	District 2
KY	2000, 2006–2014	District 2
LA	2003, 2007, 2008, 2010, 2013, 2014	District 3
MA	2001, 2004–2014	Subdistrict 1A
MD	2010–2014	Subdistrict 1B
ME	1989, 2007–2014	Subdistrict 1A
MI	2001, 2003–2006, 2008–2014	District 2
MN	2000–2002, 2006, 2010, 2012, 2013	District 2
MO	2008–2014	District 2
MS	1987–1994, 1997–2005, 2009, 2011, 2012, 2014	District 3
MT	1983–1993, 1998–2008, 2010–2014	District 4
NC	2013, 2014	Subdistrict 1C
ND	1983–1993, 1997, 1999–2014	District 2
NE	1988, 1991, 2000–2001, 2007–2014	District 2
NH	1983, 1990, 1992, 1993, 1995–1998, 2000, 2002, 2005, 2007–2014	Subdistrict 1A
NM	1994, 1995, 1997–1999, 2004–2006, 2009–2014	District 3
NV	1983–2014	District 5
OH	2005, 2006, 2009, 2010, 2012–2014	District 2
OK	2006–2014	District 2
OR	1983–1993, 1999–2014	District 5
RI	1990–1992, 1995, 1998–2003, 2005–2008, 2011–2014	Subdistrict 1A
SC	2010, 2012, 2014	Subdistrict 1C
SD	1983–1993, 2000–2014	District 2
TN	2010–2014	District 2
TX	2003–2006, 2010, 2013, 2014	District 3
UT	1983–2014	District 4
VA	2012–2014	Subdistrict 1C
VT	1992, 1993, 1995, 1998, 2000–2002, 2004–2014	Subdistrict 1A
WA	1983–1991, 1993, 1999–2014	District 5
WI	2010, 2012, 2014	District 2
WV	2008–2014	Subdistrict 1C
WY	1983–2001, 2003–2014	District 4

Physical unit prices: 1970 through 1974

Physical unit state-level prices for 1970 through 1974 are estimated from the distillate industrial prices and the average ratio of kerosene to distillate prices from *PPI* for 1975 through 1978. The average annual wholesale price ratio between kerosene and fuel oil No. 2 (distillate) is *PPI*-based data for the years 1975 through 1978. State-level kerosene industrial physical unit prices are calculated as the product of the ratios and the industrial sector distillate prices for 1970 through 1974.

Btu prices: all years

Btu prices for states are computed by converting the physical unit prices in dollars per gallon to dollars per barrel (42 gallons per barrel) and then to dollars per million Btu (5.670 million Btu per barrel). U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

2010 forward: EIA, Petroleum & Other Liquids data website, Refiner Petroleum Product Prices by Sales Type, Resale—Kerosene, http://www.eia.gov/dnav/pet/pet_pri_refoth_a_EPPK_PWG_dpgal_m.htm.

1983-2009: EIA *Petroleum Marketing Annual,* also available at http://www.eia.gov/dnav/pet/pet_pri_refoth_a_EPPK_PWG_dpgal_m.htm, select Excel file labeled "Download Series History."

1970-1982: Industrial sector distillate fuel oil price estimates for the current and previous year and the industrial sector kerosene price estimates for the previous year are from SEDS.

1975-1982: Bureau of Labor Statistics, U.S. Department of Labor, *Producer Prices and Price Indexes, Supplement,* table titled "Producer price indexes for refined petroleum products by region."

Taxes

For 1992 forward, an annual average general sales tax is calculated for each state as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the state general sales tax as of September 1 of each year is used.

For 2009, the Federation of Tax Administrators did not publish state general sales tax data, but did publish state general sales tax data for 2010. Therefore, the 2009 tax rates were estimated by comparing the Federation of Tax Administrators' 2008 and 2010 rates for each respective state. If no change occurred between 2008 and 2010, it has been assumed the rate remained constant in 2009. If a rate did change between those years, the State Department of Revenue was consulted to determine the effective date of the rate change to be used in the 2009 estimates accordingly.

1996 forward: Federation of Tax Administrators, http://www.taxadmin.org/current-tax-rates.

1995: The Council of State Governments, *The Book of the States 1994-95 and 1996-97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism,* Tables 14 and 26.

1993: Census Bureau, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled "State Gasoline, Sales and Cigarette Tax Rates as of July 1, 1993."

1983-1992: Census Bureau, U.S. Department of Commerce, *State Government Tax Collections*, table titled "State Government Excises on General Sales, Motor Fuel, and Cigarettes, Beginning and End of Fiscal Year," column "Percentage rate, Sept. 1."

Consumption

1970 forward: EIA, State Energy Data System, industrial sector kerosene consumption.

Conversion factor: all years

5.670 million Btu per barrel.

Liquefied Petroleum Gases

Prices for liquefied petroleum gases (LPG) are developed for the residential, commercial, industrial, and transportation sectors. With a few exceptions for industrial prices in the early period, they are represented by the consumer grade propane prices. Estimates of the amount of LPG consumed by sector are taken from the State Energy Data System (SEDS) and are adjusted to remove process fuel and intermediate product consumption in the industrial sector. (See the discussion under Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.)

Residential sector

For 1994 forward, residential sector LPG prices are derived by EIA from unpublished data on consumer grade propane prices collected from EIA surveys. Physical unit prices are in dollars or cents per gallon and sales taxes are added. Btu prices are then calculated using the physical unit prices and Btu conversion factors. For 1973 through 1993, residential sector LPG prices in dollars per million Btu are the average reported prices of propane delivered to residential consumers in areas where natural gas is available as a competing fuel as reported by natural gas suppliers to the American Gas Association. For 1970 through 1972, physical unit prices from the U.S. Department of Agriculture are calculated first and Btu prices are calculated by using the physical unit prices and Btu conversion factors. Taxes are included in the prices for 1970 through 1993. Prices for AK and HI in 1970 through 1993 are estimated by a different methodology described in a separate section on page 63.

Physical unit prices: 2011 forward

Before 2011, SEDS based residential propane price estimates on data from survey forms EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," and EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report." Both EIA-782A and EIA-782B were used because refiners, gas plant operators, resellers, and retailers all reported sales to the residential sector on these forms. Form EIA-782B was discontinued in 2011, and an adjustment to the estimation methodology was required. To estimate residential propane prices, regression equations are developed for the Petroleum Administration for Defense (PAD) districts and subdistricts, using EIA-782A historical refiner residential sales prices for propane as the independent variables and the combined EIA-782A and EIA-782B historical prices for residential propane prices as the dependent variables. These regression equations are used to estimate the current residential propane prices for the PAD districts and subdistricts and for states that have refiner residential prices, historical refiner/reseller/retailer prices, and sizable sales volume—AL, CT, FL, GA, IN, KY, MA, MD, ME, MS, NC, NH, NJ, NM, NY, OH, PA, RI, TN, TX, VA, VT, WI, and WV. In the past, prices for states in PAD District 5—AK, AZ, CA, HI, NV, OR, and WA—deviated drastically from the district's average prices. The 2011 propane prices for these states are estimated by applying the computed 2011 growth rate of District 5 price to the states' 2010 LPG prices. All other states are assigned the corresponding PAD district or subdistrict estimated price. They are shown in Table TN4.12. State general sales taxes are added to the state estimated prices.

For 2013 forward, refiner residential sales prices from EIA-782A are not compatible with prices from earlier years because some refiners sold their retail businesses. As an interim measure, the annual growth rates of the refiner wholesale (sales for resale) prices for the PAD districts and subdistricts are applied to the previous year's refiner residential retail prices, which are then used as independent variables in the regression equations to derive the current year residential propane prices.

Physical unit prices: 1994 through 2010

For 1994 through 2010, residential LPG prices are estimated in cents per gallon by using data collected on Forms EIA-782A and EIA-782B. No price is reported for the District of Columbia, and it is assigned the average price of Maryland and Virginia. State general sales taxes are added to the state estimated prices.

Btu prices: 1994 forward

The physical unit prices are converted to dollars per million Btu by using 42 gallons per barrel and the approximate heat content of 3.836 Btu per barrel for propane.

Btu prices: 1973 through 1990, 1992, and 1993

Propane prices by company are reported by the American Gas Association (AGA) directly in dollars per million Btu, including taxes. The simple average of available company prices is used as the state annual average. Prices that fall outside of a reasonable range are omitted from consideration for Central Hudson Gas and Electric for NY in 1979 through 1981; Arkansas Louisiana Gas for AR in 1989; Public Service Electric & Gas for NJ in 1989; Northwestern Public Service for SD in 1989; City of Long Beach for CA in 1989 and 1990; Orange & Rockland Utilities for NY in 1989 and 1990; Pike County Light & Power for PA in 1989 and 1990; Fitchburg Gas & Electric and Commonwealth

Table TN4.12. LPG residential sector PAD district and subdistrict price assignments, 2011 forward

State	Year	Asignments
AR	2011–2014	District 3
CO	2011–2014	District 4
DC	2011–2014	Subdistrict 1B
DE	2011–2014	Subdistrict 1B
IA	2011–2014	District 2
ID	2011–2014	District 4
IL	2011–2014	District 2
KS	2011–2014	District 2
LA	2011–2014	District 3
MI	2011–2014	District 2
MN	2011–2014	District 2
MO	2011–2014	District 2
MT	2011–2014	District 4
ND	2011–2014	District 2
NE	2011–2014	District 2
OK	2011–2014	District 2
SC	2011–2014	Subdistrict 1C
SD	2011–2014	District 2
UT	2011–2014	District 4
WY	2011–2014	District 4

Gas Co for MA in 1993; and Providence Gas Co. for RI in 1993.

To estimate missing prices (other than Alaska and Hawaii, which are described in a separate section that follows), simple averages of adjacent states' prices are used, as shown in Table TN4.13. Estimated data for one state are not used to estimate prices for another state.

Btu prices: 1991

Propane prices from the AGA are not available for 1991. Propane prices from the EIA *Petroleum Marketing Annual (PMA)* are used to calculate the percentage change in propane prices between 1990 and 1991 for each Petroleum Administration for Defense (PAD) district or subdistrict. These percentages are applied to the 1990 state residential LPG prices from SEDS to estimate 1991 prices for the contiguous 48 states and the District of Columbia. Prices for LPG in Alaska and Hawaii are developed by using the methodology described on page 63.

Prices for PAD Subdistricts 1A and 1B and PAD District 5 are not available for 1990 in the *PMA,* and prices for PAD Subdistrict 1A and PAD District 5

Table TN4.13. LPG residential sector price assignments, 1973 through 1993

State	Years	State prices used in the estimation
AR	1977	MO, MS, OK, TN, TX
CT	1990	MA, NY, RI
DC	1973–1983, 1990	MD
DE	1976, 1984	MD, NJ, PA
ID	1977	MT, NV, OR, UT, WA, WY
LA	1977	MS, TX
ME	1973–1977, 1985, 1986, 1992	MA, NH, VT
MO	1986	IA, IL, KS
ND	1973	MN, MT, SD
NM	1987, 1988	AZ, CO, UT
NV	1973, 1975	AZ, CA, ID, OR, UT, WY
OR	1976	CA, ID, NV, WY
SD	1986	MN, MT, ND
UT	1974, 1978, 1985, 1993	AZ, CO, ID, NV, WY
VT	1979	MA, NH, NY
WV	1992	KY, MD, OH, PA, VA

for 1991 are not available. To estimate the missing PAD district or subdistrict prices, a ratio of the end-user price to the sales for resale price for propane published for an adjacent district is calculated and applied to the known sales for resale price for the PAD districts and subdistricts without an end-user price. For 1990, the PAD District 1 end-user-to-resale ratio is multiplied by the PAD Subdistricts 1A and 1B sales for resale prices to estimate an end-user price for those subdistricts. For 1991, the PAD Subdistrict 1B end-user-to-resale ratio is multiplied by the PAD Subdistrict 1A sales for resale prices to estimate an end-user price. For both years, the U.S. end-user-to-resale price ratio is applied to the PAD District 5 sales for resale price to estimate a PAD District 5 end-user price.

Physical unit prices: 1971, 1972

Physical unit residential LPG prices are based on the city-level propane prices reported by AGA in cents per gallon. Prices for missing states are estimated. The AGA prices are the average delivered prices for propane purchased by residential consumers as of December 31.

1. City-level propane prices from AGA are assigned to their respective states. The AL 1971 price for the Phoenix City Utilities System is omitted because it falls outside a reasonable range.
2. Physical unit prices for a state are calculated directly from the available

city/utility price observations reported by AGA. Final physical unit prices are equal to the simple average of the price observations for each state.

3. MD prices are assigned for missing DC prices. AK and HI prices are discussed in a separate section that follows.

Physical unit prices: 1970

Since AGA did not publish LPG prices prior to 1971, the residential sector LPG prices for 1970 are estimated. To maintain continuity with the AGA prices for 1971 forward, prices for 1970 are estimated by using simple regression analysis. The relationship between AGA data for 1971 and 1972 and corresponding U.S. Department of Agriculture's *Agricultural Prices* data is the basis for the estimation.

1. Before regression analysis can be applied, *Agricultural Prices* data for 1970 through 1972 are prepared for 49 states (no AK or HI prices are available). These prices include taxes. Development of AK and HI prices are described in a separate section below.
   a. State-level prices for small purchases, representing residential end users, for 1970 through 1972 are published by *Agricultural Prices* in cents per pound. When price per pound data are not available, price per gallon data, representing larger volume purchases, are used. These prices per gallon are multiplied by 0.543, the average ratio of price per pound to price per gallon for the United States for 1970 through 1972, to create uniform input data in price per pound.
   b. For 1971 and 1972, the price reported for the New England Region is assigned to CT, MA, ME, NH, RI, and VT.
   c. Data in cents per pound are converted to dollars per gallon by multiplying by the propane conversion factor of 4.2 pounds per gallon (taken from the *Petroleum Products Handbook*) and dividing by 100.
   d. Missing prices use adjacent states' average prices as shown in Table TN4.14.
2. The physical unit AGA prices and *Agricultural Prices* data for 1971 through 1972 (excluding AK and HI) are used with simple regression analysis to estimate final physical unit LPG residential prices.

Btu prices: 1970 through 1972

For 1970 through 1972, Btu prices for states are calculated by converting the physical unit prices by using the approximate heat content of 3.836 million Btu per barrel for propane. U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Table TN4.14. LPG residential agricultural prices assigned to estimate 1970 prices

State	Years	State prices used
DC	1970–1972	MD
NV	1970, 1971	AZ, CA, ID, UT
OR	1971–1972	CA, ID
UT	1972	AZ, CO, ID, NV, WY
WA	1970–1972	CA, ID

Alaska and Hawaii prices: 1970 through 1993

Prices cannot be estimated for AK and HI by using adjacent state price assignments. Missing prices for these two states are estimated by computing ratios of the AK or HI prices to the simple average U.S. prices calculated from the AGA data for years when AK or HI prices are available and applying these ratios to the U.S. simple average prices in years when prices need to be estimated.

1. AGA prices for AK are available in 1972 and 1980. The 1972 AK-to-U.S. ratio is used to estimate prices for 1970, 1971, and 1973 through 1979. The 1980 AK-to-U.S. price ratio is used to estimate prices for 1981 through 1993.
2. AGA prices for HI are available in 1971, 1977 through 1979, and 1989. The 1971 HI-to-U.S. AGA is used to estimate prices for 1970 and 1972 through 1974. The average ratio of the HI-to-U.S. prices for 1977 through 1979 is used to estimate prices for 1975, 1976, and 1980 through 1984. The 1989 HI-to-U.S. ratio is used to estimate prices for 1985 through 1988 and 1990 through 1993.

Data sources

Prices

2011 forward: Unpublished price data from EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report."

1994-2010: EIA, Forms EIA-782A "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," and EIA-782B "Resellers'/Retailers' Monthly Petroleum Product Sales Report."

1971-1990, 1992, 1993: American Gas Association (AGA), *Gas Househeating Survey* (1971-1988), *Residential Gas Market Survey* (1989 and 1990), and *Residential Natural Gas Market Survey* (1992, 1993), Appendix 2, "Competitive Fuel Prices."

1991: EIA, State Energy Data System, 1990 residential sector LPG prices.

1991: EIA, *Petroleum Marketing Annual,* Table 35 (1990 and 1991), columns titled "Propane (Consumer Grade)."

1970-1972: Crop Reporting Board, U.S. Department of Agriculture, *Agricultural Prices,* table titled "Average Price Paid by Farmers for Lawn Mowers and Petroleum Products, Specified Dates, by State," column titled "L.P. Gas."

Taxes

An annual average general sales tax is calculated for each state as a simple average of the 12 monthly values. This method takes into account tax changes during the year.

1996 forward: Federation of Tax Administrators, http://www.taxadmin.org/current-tax-rates.

1995: The Council of State Governments, *The Book of the States 1994-95* and *1996-97,* Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism***,** Tables 14 and 26.

Consumption

1970 forward: EIA, State Energy Data System, residential sector LPG consumption.

Conversion factors: all years

1970-1972, 1994 forward: 3.836 million Btu per barrel.

1970-1972: 4.2 pounds per gallon from Guthrie, Virgil, ed., 1960. *Petroleum Products Handbook*. John Wiley and Sons, Inc., New York, New York, pages 3-5.

Conversion factors are not necessary for other years because Btu prices are available directly from the data sources.

Commercial sector

Physical unit prices: 2011 forward

Before 2011, SEDS based commercial propane price estimates on data from survey forms EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," and EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report." Both EIA-782A and EIA-782B were used because refiners, gas plant operators, resellers, and retailers all reported sales to the commercial sector on these forms. Form EIA-782B was discontinued in 2011, and an adjustment to the estimation methodology was required. To estimate commerical propane prices, regression equations are developed for the Petroleum Administration for Defense (PAD) districts and subdistricts, using EIA-782A historical refiner commercial sales prices for propane as the independent variables and the combined EIA-782A and EIA-782B historical prices for commercial propane prices as the dependent variables. These regression equations are used to estimate the current commercial propane prices for the PAD districts and subdistricts. All states are assigned the corresponding PAD district or subdistrict estimated price. State general sales taxes are added to the state estimated prices.

For 2013 forward, refiner commercial sales prices from EIA-782A are not compatible with prices from earlier years because some refiners sold their retail businesses. As an interim measure, the annual growth rates of the refiner wholesale (sales for resale) prices for the PAD districts and subdistricts are applied to the previous year's refiner commercial retail prices, which are then used as independent variables in the regression equations to derive the current year commercial propane prices.

Physical unit prices: 1994 through 2010

For 1994 through 2010, commercial sector prices for LPG are estimated from PAD district or subdistrict prices for consumer grade propane sold to commercial and institutional consumers published in cents per gallon in the EIA *Petroleum Marketing Annual.* PAD district or subdistrict prices are assigned to all states within each PAD district or subdistrict and general state sales taxes are added.

Btu prices: 1994 forward

The physical unit prices are converted to dollars per million Btu using 42 gallons per barrel and the approximate heat content of 3.836 million Btu per barrel for propane.

Physical unit prices: 1970 through 1993

For 1970 through 1993, state physical unit prices from the industrial sector are assigned to the commercial sector.

Data sources

Prices

2011 forward: Unpublished price data from EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report."

1994-2010: EIA, *Petroleum Marketing Annual,* http://www.eia.gov/oil_gas/

petroleum/data_publications/petroleum_marketing_annual/pma_historical.html, Table 38, column titled, "Commercial/Institutional Consumers" (1994-2006) and Table 34 (2007-2009), and on the EIA website at http://www.eia.gov/dnav/pet/pet_pri_prop_a_EPLLPA_PCS_dpgall_a.htm.

1970-1993: EIA, industrial sector LPG prices from the State Energy Data System.

Taxes

An annual average general sales tax is calculated for each state as a simple average of the 12 monthly values. This method takes into account tax changes during the year.

1996 forward: Federation of Tax Administrators, http://www.taxadmin.org/current-tax-rates.

1995: The Council of State Governments, *The Book of the States 1994-95* and *1996-97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism,* Tables 14 and 26.

Consumption

1970 forward: EIA, State Energy Data System, commercial sector LPG consumption.

Conversion factors: all years

3.836 million Btu per barrel.

Industrial sector

From 1985 forward, industrial sector LPG prices are estimated as the average of propane prices to industrial customers, petrochemicals, and other end users; to manufacturing firms; to farmers; or refiner and gas plant operator sales to end users, depending on the data sources for the different years. Prices for 1985 through 2009 are based on data from the EIA *Petroleum Marketing Annual (PMA)*. For 2010, *PMA* is no longer available, but the same set of physical unit prices in dollars per gallon (excluding taxes) are available on the EIA website. For 2011 forward, industrial sector LPG prices are estimated by EIA.

Prices for 1978 through 1981 are taken from the U.S. Department of Commerce, Census Bureau, *Annual Survey of Manufactures (ASM)* or the *Census of Manufactures (CM)* and prices for 1970 through 1977 and 1982 through 1984 are derived from *Agricultural Prices* and scaled to the *ASM/CM* prices by using the ratio of *ASM/CM to Agricultural Prices* LPG prices for the years 1978 through 1981, when both price series were available. Taxes are included in the industrial sector prices for all years.

Physical unit prices: 2011 forward

Before 2011, SEDS based industrial propane price estimates on data from survey forms EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," and EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report." Both EIA-782A and EIA-782B were used because refiners, gas plant operators, resellers, and retailers all reported sales to the industrial sector on these forms. Form EIA-782B was discontinued in 2011, and an adjustment to the estimation methodology was required. To estimate industrial propane prices, regression equations are developed for the Petroleum Administration for Defense (PAD) districts and subdistricts, using EIA-782A historical refiner industrial sales prices for propane as the independent variables and the combined EIA-782A and EIA-782B historical prices for industrial propane prices as the dependent variables. These regression equations are used to estimate the current industrial propane prices for the PAD districts and subdistricts. All states are assigned the corresponding PAD district or subdistrict estimated price. State general sales taxes are added to the state estimated prices.

For 2013 forward, refiner industrial sales prices from EIA-782A are not compatible with prices from earlier years because some refiners sold their retail businesses. As an interim measure, the annual growth rates of the refiner wholesale (sales for resale) prices for the PAD districts and subdistricts are applied to the previous year's refiner industrial retail prices, which are then used as independent variables in the regression equations to derive the current year industrial propane prices.

Physical unit prices: 1994 through 2010

For 1994 through 2010, industrial sector physical unit prices are reported by PAD district or subdistrict, but not by state. Consumer grade propane prices are reported for three industrial sector categories—petrochemical plants, other end users (agricultural consumers), and industrial consumers. For petrochemicals, withheld and out-of-range prices are assigned the U.S. average petrochemical price or other estimate in the calculations.

Physical unit prices: 1985 through 1993

Industrial sector LPG physical unit state prices for 1985 forward are estimated by using physical unit annual prices in *PMA* for consumer grade propane sales to end users and state general sales taxes are added. Where prices are

not available, the PAD district or subdistrict price is assigned to the state, as shown in Table TN4.15. One exception is Arkansas for 1992 and 1993. Because the neighboring states in PAD District 3 are LPG producers, the PAD District 3 price is uncharacteristically lower than previously reported prices for Arkansas. Therefore, the 3 monthly prices available for Arkansas in 1992 are averaged to derive an annual price. In 1993, the Missouri price is assigned to Arkansas.

When a PAD district or subdistrict price is not available, a consumption-weighted average price is calculated by using available prices for states within the district and the SEDS industrial sector LPG consumption for those states. PAD District 5 price for 1985 is calculated as a consumption-weighted average of AK, CA, OR, and WA prices; PAD Subdistrict 1A price for 1986 uses the average of CT and NH prices; and PAD Subdistrict 1A prices for 1987 through 1988 use the average of CT and MA prices.

When a PAD district or subdistrict price is not available and there are no state data within the PAD district or subdistrict to develop a consumption-weighted average, a different methodology is used. The source table also contains sales for resale prices. To estimate the missing sales to end-users PAD district or subdistrict price, a ratio of the end-users price to the sales for resale price for an adjacent PAD district or subdistrict is calculated and applied to the known sales for resale price for the PAD district or subdistrict that does not have an end-user price. PAD district and subdistrict prices used in the estimations are shown in Table TN4.16.

Physical unit prices: 1982 through 1984, 1970 through 1977

Industrial sector LPG physical unit prices for 1982 through 1984 and 1970 through 1977 are estimated on the basis of the relationship between state-level LPG prices from *Agricultural Prices* and the prices calculated from *Annual Survey of Manufactures (ASM)* or *Census of Manufactures (CM)* for 1978 through 1981.

1. Before the adjustment factor that relates *Agricultural Prices* and *ASM/CM* data is computed, monthly *Agricultural Prices* data are converted into annual prices and missing data are estimated.
   a. Annual LPG prices are calculated as simple averages of the monthly prices from *Agricultural Prices* for the years 1977 through 1984. The only states missing data are WV in 1977 through 1981 and AK, DC, and HI in 1977 through 1984. WV is assigned the simple average of the KY, MD, OH, PA, and VA prices. AK, DC, and HI prices are discussed below.
   b. The average ratio of *ASM/CM*-based final prices for 1978 through 1981 and the 1978 through 1981 *Agricultural Prices* annual prices is

Table TN4.15. LPG industrial sector PAD district and subdistrict price assignments, 1985 through 1993

State	Years	Assignments
AK	1986–1988, 1990–1993	District 5
AL	1985–1988	District 3
AZ	1985–1993	District 5
CA	1990–1993	District 5
CO	1991	District 4
CT	1990–1993	Subdistrict 1A
DC	1985–1993	Subdistrict 1B
DE	1986–1993	Subdistrict 1B
FL	1990–1993	Subdistrict 1C
GA	1985, 1990–1993	Subdistrict 1C
HI	1985–1993	District 5
IA	1986, 1991–1993	District 2
ID	1986, 1990–1993	District 4
IN	1990	District 2
KS	1986–1989, 1992	District 2
MA	1986, 1990–1993	Subdistrict 1A
MD	1988, 1990–1993	Subdistrict 1B
ME	1986–1993	Subdistrict 1A
MI	1985–1988, 1990	District 2
MN	1985, 1986, 1988–1991, 1993	District 2
MS	1990–1993	District 3
MT	1990–1993	District 4
NC	1991, 1992	Subdistrict 1C
ND	1985, 1986, 1991–1993	District 2
NE	1986–1992	District 2
NH	1987–1993	Subdistrict 1A
NM	1993	District 3
NV	1985–1988, 1990–1993	District 5
NY	1990–1993	Subdistrict 1B
OH	1990	District 2
OK	1986, 1987	District 2
OR	1986, 1990–1993	District 5
PA	1990–1993	Subdistrict 1B
RI	1986–1993	Subdistrict 1A
SC	1992	Subdistrict 1C
SD	1985–1993	District 2
TN	1990–1993	District 2
UT	1986–1988, 1990–1993	District 4
VT	1986–1993	Subdistrict 1A
WA	1986–1993	District 5
WI	1985, 1986, 1990	District 2
WV	1989–1993	Subdistrict 1C
WY	1987, 1988	District 4

Table TN4.16. LPG industrial sector, PAD district and subdistrict price estimates, 1990 through 1993

Year	Missing prices	Prices used in estimation
1990	Subdistrict 1A	District 1
	Subdistrict 1B	District 1
	District 5	U.S.
1991	Subdistrict 1A	Subdistrict 1B
	District 5	U.S.
1992	Subdistrict 1A	Subdistrict 1C
	Subdistrict 1B	Subdistrict 1C
1993	Subdistrict 1A	Subdistrict 1C
	Subdistrict 1B	Subdistrict 1C

calculated for 48 states (excluding AK, DC, and HI) as the simple average of the ratio over the 4 years. This average ratio is used as an adjustment factor.

2. Final industrial sector LPG prices for 1982 through 1984 and 1970 through 1977 are estimated by using the state-level adjustment factors and annual average LPG prices from *Agricultural Prices* for these years.
   a. Annual average LPG prices are calculated for 1982 through 1984 and 1970 through 1977 as the simple average of the monthly prices.
   b. *Agricultural Prices* published annual average prices in dollars per gallon for all states in 1975 and 1976. For DE in 1970 through 1974, MD in 1970 through 1974, VA in 1970 through 1974, and WV in 1970 through 1972, only prices for small volume purchases in cents per pound were published. These are converted to cents per gallon by multiplying by 1.96, the average ratio of cents per gallon to cents per pound for the United States for 1970 through 1974.
   c. For 1970 through 1972, *Agricultural Prices* are converted from cents per gallon to dollars per gallon.
   d. For 1971 through 1973, the New England price per gallon reported by *Agricultural Prices* is assigned to CT, MA, ME, NH, RI, and VT.
   e. MD prices are assigned to DC in 1970 through 1972, 1974 through 1977, and 1982 through 1984. The combined MD/DE price in 1973 is assigned to MD, DE, and DC.
   f. Excluding AK and HI, states missing *Agricultural Prices* LPG prices are assigned the simple average price of adjacent states. The states with missing data and the adjacent state assignments are shown in Table TN4.17.
   g. Industrial sector LPG physical unit prices for 1970 through 1977 and 1982 through 1984 for all states (except AK, DC, and HI) are calculated by using the estimated annual *Agricultural Prices* data for the respective year and the state-level average ratios as adjustment factors.

Table TN4.17. LPG industrial sector price assignments, 1970 through 1976

State	Years	State prices used in the estimation
CT	1974	NY
MA	1974	NY
ME	1974	NY
NH	1974	NY
NV	1970–1971	AZ, CA, ID, UT
	1973–1974	AZ, CA, ID
OR	1970–1974	CA, ID
RI	1974	NY
	1975–1976	CT, MA, NY
UT	1972	AZ, CO, ID, NV, WY
	1973–1974	AZ, CO, ID, WY
VT	1974	NY
WA	1970–1974	CA, ID

3. AK prices for 1970 through 1977 and 1982 through 1984 and HI prices for 1970 through 1977 and 1982 through 1984 are estimated by using the relationship between *ASM/CM* based prices for these states and the U.S. price reported by *Agricultural Prices* (1979 through 1981 for AK and 1978 through 1981 for HI). The average ratio for the available years for the two states is calculated and used with the *Agricultural Prices* U.S. prices for the years to be estimated.

Physical unit prices: 1978 through 1981

For 1978 through 1981, the industrial sector LPG prices are either calculated directly from cost and quantity data from the *ASM* or the *CM* or are estimated by using the relationship of *ASM/CM* data to LPG price data from *Agricultural Prices*.

1. For 1978 through 1981, industrial sector physical unit prices for LPG are calculated as the average cost per unit from cost and quantity data published in *ASM/CM*. Since sales are reported in pounds, the prices are converted to dollars per gallon. The conversion factor of 4.5 pounds per gallon is from *ASM/CM*.
2. The AK price for 1978 is the consumption-weighted average Census division price. In addition, four states have prices estimated as the simple average of the prices of adjacent states, and DC is assigned the MD price, as shown in Table TN4.18.

Btu prices: all years

Table TN4.18. LPG industrial sector price assignments, 1978 through 1981

State	Years	State prices used
AR	1978	LA, MO, MS, OK, TX
DC	1978–1981	MD
LA	1980	AR, MS, TX
NM	1979–1981	AZ, CO, OK, TX
WY	1978–1981	CO, ID, MT, ND, NE, SD, UT

Btu prices for the states are calculated from the physical unit prices and the conversion factors shown in Table TN4.19. U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS, adjusted for process fuel and intermediate product consumption.

Data sources

Prices

2011 forward: Unpublished price data from EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report."

1994-2010: EIA, *Petroleum Marketing Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html, prices from Table 38, columns titled "Industrial Consumers," "Petrochemical," and "Other End Users" (1994-2006) and Table 34 (2007-2009) and on the EIA website at http://www.eia.gov/dnav/pet/pet_pri_prop_a_EPLLPA_pin_dpgal_a.htm, and unpublished associated volumes are used to calculate consumption-weighted average prices.

1985-1993: EIA, *Petroleum Marketing Annual,* Table 21 (1985), Table 33 (1986-1988), and Table 35 (1989-1993), columns titled "Propane (Consumer Grade)," "Sales to End Users," and "Sales for Resale."

1970-1984: Crop Reporting Board, U.S. Department of Agriculture, *Agricultural Prices,* tables titled "Average Price Paid by Farmers for Lawn Mowers and Petroleum Products, Specified Dates, by State," column titled "L.P. Gas," (1970-1976); "Household Supplies: Average Price Paid by Farmers" (1977-1979); "L.P. Gas: Average Price Paid by States" (1980); and "L.P. Gas: Average Price Paid by Months by States" (1981-1984).

1981: Census Bureau, U.S. Department of Commerce, *1982 Census of Manufactures, Fuels and Electric Energy Consumed, Part 2, States and Standard Metropolitan Statistical Areas by Major Industry Groups,* Table 3, state-level quantity and cost of liquefied petroleum gases.

1978-1980: Census Bureau, U.S. Department of Commerce, *Annual Survey of Manufactures, Fuels and Electric Energy Consumed, States by Industry Group and Standard Metropolitan Statistical Areas by Major Industry Group*, Table 3, state-level quantity and cost of liquefied petroleum gases.

Table TN4.19. LPG Btu conversion factors for the industrial sector, 1970 forward

Year	Conversion factor	Year	Conversion factor	Year	Conversion factor
1970	3.736	1985	3.546	2000	3.539
1971	3.724	1986	3.591	2001	3.544
1972	3.708	1987	3.613	2002	3.547
1973	3.691	1988	3.606	2003	3.561
1974	3.670	1989	3.640	2004	3.554
1975	3.645	1990	3.566	2005	3.553
1976	3.640	1991	3.554	2006	3.544
1977	3.590	1992	3.571	2007	3.524
1978	3.579	1993	3.543	2008	3.511
1979	3.640	1994	3.585	2009	3.466
1980	3.633	1995	3.571	2010	3.473
1981	3.594	1996	3.552	2011	3.440
1982	3.562	1997	3.559	2012	3.467
1983	3.549	1998	3.557	2013	3.488
1984	3.546	1999	3.553	2014	3.460

Taxes

For 1992 forward, an annual average general sales tax is calculated for each state as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the state general sales tax as of September 1 of each year is used.

1996 forward: Federation of Tax Administrators, http://www.taxadmin.org/current-tax-rates.

1995: The Council of State Governments, *The Book of the States 1994-95* and *1996-97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism,* Tables 14 and 26.

1993: Census Bureau, U.S. Department of Commerce, *State Tax Review,* Volume 54, No. 31, map titled "State Gasoline, Sales and Cigarette Tax Rates as of July 1, 1993."

1985-1992: Census Bureau, U.S. Department of Commerce, *State Government Tax Collections,* table titled "State Government Excises on General Sales, Motor Fuel, and Cigarettes, Beginning and End of Fiscal Year," column "Percentage

rate, Sept. 1."

Consumption

1994 forward: EIA, unpublished volume data for "Industrial Consumers," "Petrochemical," and "Other End Users"collected on Form EIA-782B for consumption-weighted average industrial sector price calculations.

1970 forward: EIA, State Energy Data System, industrial sector LPG consumption.

Conversion factors: all years

1970 forward: EIA, State Energy Data System, Consumption Technical Notes, Table B1, as shown in Table TN4.19.

Transportation sector

Physical unit prices: 2011 forward

The survey that provides reseller and retailer sales prices for propane by sales type, Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," was discontinued in 2011. As a result, data for propane prices by sales type, which are based on Form EIA-782B as well as Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," are no longer available. To estimate transportation propane prices, regression equations are developed for the Petroleum Administration for Defense (PAD) districts and subdistricts using historical refiner residential and/or commercial sales prices for propane from EIA-782A as the independent variables and the historical prices for consumer grade propane sold through retail outlets as the dependent variables. These regression equations are used to estimate the current transportation propane prices for the PAD districts and subdistricts. All states are assigned the corresponding PAD district or subdistrict estimated price. State motor fuel taxes are added to the state estimated prices.

For 2013 forward, refiner retail prices from EIA-782A are not compatible with prices from earlier years because some refiners sold their retail businesses. As an interim measure, the annual growth rates of the refiner wholesale (sales for resale) prices for the PAD districts and subdistricts are applied to previous year's refiner residential and commercial retail prices, which are then used as independent variables in the regression equations to derive the current year transportation propane prices.

Physical unit prices: 1970 through 2010

For 1994 through 2010, transportation sector prices are estimated from PAD district or subdistrict prices for consumer grade propane sold through retail outlets published in the EIA *Petroleum Marketing Annual* or from unpublished data collected on Forms EIA-782A and EIA-782B. Physical unit PAD district or subdistrict prices are assigned to all states within a PAD district or subdistrict and state motor fuel taxes are added.

For 1985 through 1993, state physical unit prices from the industrial sector are assigned to the transportation sector and LPG motor fuel taxes are added.

For 1970 through 1984, state physical unit prices from the industrial sector, including taxes, are assigned to the transportation sector.

Btu prices: all years

The physical unit prices are converted to dollars per million Btu using 42 gallons per barrel and the approximate heat content of 3.836 million Btu per barrel for propane.

Data sources

Prices

2011 forward: Unpublished price data from EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report."

1994-2010: EIA, Forms EIA-782A "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," and EIA-782B "Resellers'/Retailers' Monthly Petroleum Product Sales Report," propane prices, sales to end-users through retail outlets, for the PAD districts and subdistricts.

Taxes

1985 forward: Federal Highway Administration, U.S. Department of Transportation, *Highway Statistics*, Table MF-121T for state tax rates on liquefied petroleum gases as motor fuel, supplemented with information from state revenue offices.

Consumption

1970 forward: EIA, State Energy Data System, transportation sector LPG consumption.

Conversion factors: all years

3.836 million Btu per barrel.

Lubricants

Lubricant prices are developed for the industrial sector and are assigned to the transportation sector. State-level prices are not available for either sector; national-level prices are assigned to all states and do not include end-user taxes paid at the time of sale. Estimates of lubricant consumption by the industrial and transportation sectors are taken from the State Energy Data System (SEDS).

Physical unit prices: 1983 forward

Prices of lubricants are estimated by applying the annual growth rate of the producer price index for finished lubricants, compiled by the U.S. Department of Labor, Bureau of Labor Statistics, to the lubricant price estimate from the previous year.

The method of estimating shipment prices using U.S. Census Bureau data (see *Physical unit prices: 1970 through 1982*) could not be used after 1982 because the volume of product shipments is no longer available. Earlier attempts of replacing the volume of shipments with an adjusted SEDS consumption estimate was not satisfactory, as variations caused by incompatibility of two different sources would be reflected in the resultant price estimates.

Physical unit prices: 1970 through 1982

Prices of lubricants are estimated from U.S. Department of Commerce, Census Bureau, data for three product categories:

1. Lubricating oils made in refineries (SIC 29117.21) and not made in refineries (SIC 29920.21).
2. Lubricating greases made in refineries (SIC 29117.31) and not made in refineries (SIC 29920.31).
3. Lubricating oils and greases, not specifically known (n.s.k.), made in refineries (SIC 29117.00) and not made in refineries (SIC 29920.00 for establishments with 10 employees or more and SIC 29920.02 for establishments with fewer than 10 employees).

For the years where *Census of Manufactures (CM)* data are available (1967, 1972, 1977, and 1982), total shipments are calculated by adding the shipments for the three product categories. Shipments for the third product category are withheld and estimated by dividing their value of shipments sum by the weighted average cost of the product categories SIC 29920.21 and 29920.31.

Total shipments in each year for which *CM* data are available is divided by the estimated SEDS total lubricants consumption (in physical units) for that year to establish a shipments-to-consumption ratio. Ratios for the years not covered by the *CM* (i.e., 1968 through 1971, 1973 through 1976, and 1978 through 1981) are estimated by linear interpolation. Total shipments for the years not covered by the *CM* are estimated by multiplying SEDS consumption data by the appropriate shipment-to-consumption ratio.

Estimated shipment prices are calculated by dividing the value of shipments shown in the *CM* (for 1972, 1977, and 1982) or the *Annual Survey of Manufactures* (for all other years) by the estimated shipments for each product category. The shipment prices are assumed to represent wholesale prices.

End-user prices in dollars per barrel are estimated by multiplying the shipment (wholesale) prices by trade ratio factors that represent the wholesale-to-retail markup. The trade ratio factors are developed from Bureau of Economic Analysis (BEA) data for 1972 and 1977. For 1972, the sum of data called "purchasers value" for the three product categories is divided by the sum of the "producers value" for the three categories to derive a trade ratio. A similar calculation is made for 1977, but the terms "purchase value" and "basic value" are used in the source data.

The 1972 ratio is used for 1970 through 1972, and the 1977 ratio is used for 1977 forward. The values for 1973 through 1976 are estimated by linear interpolation by using the 1972 and 1977 values. The trade ratio for 1982 is not used because the range of petroleum products included in the ratio was expanded by BEA and the ratio would no longer represent the specific markup for lubricants.

Btu prices: all years

Btu prices are obtained by dividing the prices in dollars per barrel by the conversion factor (6.065 million Btu per barrel).

Data sources

Prices

1983 forward: U.S. Department of Labor, Bureau of Labor Statistics, Producer Price Indexes, Commodity Data, Item 0576 Finished Lubricants, not seasonally adjusted (series ID: WPU0576), available at http://www.bls.gov/ppi/data.htm.

1970, 1971, 1973 through 1976, and 1978 through 1981: Census Bureau, U.S. Department of Commerce, *Annual Survey of Manufactures; Lubricating Oils and Greases* (SIC 29117 and 29920).

1972, 1977, and 1982: Census Bureau, U.S. Department of Commerce, *Census of Manufactures, Petroleum Refining; Lubricating Oils and Greases* (SIC 29117 and

29920).

1972 and 1977: Bureau of Economic Analysis, U.S. Department of Commerce, Input-Output Table Work Tapes for (SIC Codes 29117 and 29920).

Consumption

1970 forward: EIA, State Energy Data System, lubricants consumption.

Conversion factor: all years

6.065 million Btu per barrel.

Motor Gasoline

Motor gasoline prices are developed for the transportation sector, and the transportation sector prices are assigned to the commercial and industrial sectors. Motor gasoline consumed in privately-owned vehicles is accounted for in the transportation sector. Estimates of motor gasoline consumed by the transportation, commercial, and industrial sectors used in calculating expenditures are taken from SEDS. Prices in this series are retail prices, including federal and state motor fuel taxes. Due to the lack of uniformity in application, state general sales taxes and local fuel and sales taxes are not included. Finished motor gasoline includes conventional gasoline, all types of oxygenated gasoline including gasohol, and reformulated gasoline, but excludes aviation gasoline.

Physical unit prices: 2011 forward

The survey form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," which was the main source of motor gasoline prices, was suspended after data year 2010. For 2011 forward, motor gasoline physical unit prices for CA, CO, FL, MA, MN, NY, OH, TX, and WA are estimated by applying the annual average growth rates derived from the U.S. Energy Information Administration's (EIA) survey form EIA- 878, "Motor Gasoline Price Survey" for those states. The remaining state prices are estimated by applying the annual average growth rate of the corresponding Petroleum Administration for Defense (PAD) district or subdistrict price to the previous year's state prices.

Physical unit prices: 2000 through 2010

For 2000 through 2010, motor gasoline physical unit prices are based on the average annual sales prices (excluding taxes) of finished motor gasoline to end users through retail outlets contained in Table 28 of the U.S. Energy Information Administration's (EIA) *Petroleum Marketing Annual (PMA).* This series reflects data collected from refiners, resellers, and retailers in the industry (survey forms EIA-782A and EIA-782B), and provides more comprehensive coverage. Data are available for all states except the District of Columbia, which has prices withheld for some years. In these instances, the price is estimated by applying the change in price for sales for resale (a type of wholesale sales) over the previous year to the previous year's price for sales to end users through retail outlets.

State and federal motor gasoline tax rates are added to the prices from the *PMA.* State tax information and annual federal tax information are taken from Table EN1 of *PMM.* EIA updates this table twice a year, reporting the tax rates effective January 1 or July 1. To compile the average tax rates for the year, information on the effective date of rate changes is collected from additional sources. These include State Department of Revenue offices, the U.S. Department of Defense, Defense Energy Support Center, annual report entitled *Compilation of United States Fuel Taxes, Inspection Fees and Environmental Taxes and Fees,* and the U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics* report. They are combined with the federal tax rate to adjust the *PMA* prices.

Physical unit prices: 1983 through 1999

For 1983 through 1999, motor gasoline physical unit prices are based on the average annual refiner motor gasoline prices (excluding taxes) for sales to end users through retail outlets, published in the *PMA.* When the state-level prices are not available, the PAD district or subdistrict price is assigned to the state, except for certain states and years, as noted in Table TN4.20, that are derived from sales for resale prices or from the Bureau of Labor Statistics' *Consumer Prices: Energy (CPI).*

State and federal motor gasoline taxes are added to the prices from the *PMA.* Monthly state tax information and annual federal tax information are taken from the U.S. Department of Transportation's *Highway Statistics.* The monthly state taxes are averaged to create an average annual tax for each state, which is combined with the federal tax to adjust the *PMA* price. Due to the lack of uniformity in application, state and local general sales taxes are not included.

Motor gasoline prices for sales to end users through retail outlets are withheld for Maryland and unavailable for the District of Columbia in all years. To derive end-user prices for Maryland each year, the ratio of the prices for sales for resale (a type of wholesale sales) to the prices for sales to end users (retail sales) through company outlets in the neighboring states of Delaware, Pennsylvania, Virginia, and West Virginia are averaged and that average ratio is applied to the sales for resale prices for Maryland. End-user prices for the District of Columbia are derived using the ratio of Virginia's sales for resale prices to end-user prices.

Motor gasoline prices for Hawaii are not available in the *PMA* prior to 1991. They are also not collected or published in the *CPI* after December 1986. The following method is used to derive Hawaii prices for 1987 through 1990. The monthly Hawaii *CPI* prices are used to calculate annual averages for 1983 through 1986. The annual averages are divided by the *PMA* PAD District 5 price (with Hawaii state and federal taxes added) for each year to develope annual ratios of the two prices. The four ratios for 1983 through 1986 are averaged to give one ratio that is multiplied by the *PMA* PAD District 5 prices for 1987 through 1990 to estimate Hawaii prices for those years. State and

Table TN4.20. Motor gasoline price assignments, 1983 through 1999

State	Year	Source
AK	1983–1986	CPI
CT	1989–1999	PMA, PAD Subdistrict 1A
DC	1983–1999	PMA, Wholesale/retail adjustment
DE	1991–1993	PMA, PAD Subdistrict 1B
HI	1983–1986	CPI
	1987–1990	PMA, PAD District 5 adjustment
ID	1993, 1994	PMA, PAD District 4
MD	1985–1999	PMA, Wholesale/retail adjustment
ME	1985–1988, 1990–1999	PMA, PAD Subdistrict 1A
MT	1991–1999	PMA, PAD Subdistrict 4
ND	1996	PMA, PAD District 2
NH	1995	PMA, PAD Subdistrict 1A
SD	1987, 1991, 1992	PMA, PAD District 2
WY	1985	PMA, PAD District 4

federal taxes are added to the estimates.

In the states and years (shown in Table TN4.20) where prices are derived from the *CPI*, monthly *CPI* city prices are weighted by monthly consumption from *Highway Statistics*. All taxes are included in the *CPI* data.

Physical unit prices: 1982

Monthly physical unit motor gasoline prices for 1982 are taken from the *Platt's Oil Price Handbook and Oilmanac (Platt's)* table "AAA 'Fuel Gauge' Report," the *CPI*, or both. Table TN4.21 summarizes price data availability by source. The *Platt's* prices are reported for both leaded and unleaded motor gasoline and for both full-service and self-service for all states except AK and HI. All available *Platt's* prices for 1982 are used in the calculation of motor gasoline prices. The continuity of these prices with prices published by *Platt's* in previous years suggests that taxes are included.

The available *CPI* monthly physical unit motor gasoline prices for 1982 are for all types of motor gasoline and cover 25 states, as shown in Table TN4.22. The *CPI* prices are assigned to any state that has a county included in the Standard Metropolitan Statistical Area (SMSA) definitions used by the Bureau of Labor Statistics. These "all types" prices cover leaded regular, unleaded regular, and leaded premium and include taxes. All the available *CPI* prices for 1982 are also used in the calculation of motor gasoline prices. Complete monthly data exist for the 25 states covered by the *CPI*. The *CPI* Detailed Report of April 1986 explicitly states that federal, state, and local taxes are included.

To combine the product-specific Platt's prices with the "all types" prices

Table TN4.21. Summary of motor gasoline price data by year, 1970 through 1982

Years	Source	Grades covered	Composite price	Missing states all sources
1982	Platt's	leaded	no	none
		unleaded	no	
	CPI	leaded regular	yes	
		leaded premium	yes	
		unleaded regular	yes	
1979–1981	Platt's	leaded regular	no	AR, DE, ME, MS,
		leaded premium	no	MT, ND, NH, OK,
		unleaded regular	no	RI, SC, SD, VT,
		unleaded premium	no	WV, WY
	CPI	leaded regular	yes	
		leaded premium	yes	
		unleaded regular	yes	
1978	Platt's	leaded regular	no	none
	CPI	leaded regular	yes	
		leaded premium	yes	
		unleaded regular	yes	
1976, 1977	Platt's	leaded regular	no	AK
	CPI	leaded regular	no	
		leaded premium	no	
		unleaded regular	no	
1974, 1975	Platt's	leaded regular	no	AK
	CPI	leaded regular	no	
		leaded premium	no	
1970–1973	Platt's	leaded regular	no	AK, HI

published in the *CPI*, the *Platt's* prices are weighted into "all types" prices by using annual U.S. data from the *Monthly Energy Review (MER)* to calculate shares for leaded and unleaded motor gasoline (no breakdowns for regular and premium are possible because of data limitations).

Motor gasoline price data reported by *Platt's* for 1982 cover the following months: February, April, June, August, November, and December. The missing six months are assigned prices as follows: January is assigned the February price, and the other missing months are assigned the average price of the preceding and succeeding months. A missing February price for MO is assumed to be equal to the April price, and a missing price for OR is assumed to be equal to the average of the April and August prices.

For states with data from *Platt's* only, prices by product type (leaded and

Table TN4.22. Motor gasoline price assignments from consumer prices: energy, 1978 through 1982

State	City price assignments
AK	Anchorage
CA	Los Angeles-Long Beach-Anaheim, San Dego, San Francisco, Oakland
CO	Denver-Boulder
DC	Washington
FL	Miami
GA	Atlanta
HI	Honolulu
IL	Chicago-Northwestern Indiana, St. Louis
IN	Chicago-Northwestern Indiana, Cincinnati
KS	Kansas City
KY	Cincinnati
MA	Boston
MD	Baltimore, Washington
MI	Detroit
MN	Minneapolis-St. Paul
MO	St. Louis, Kansas City
NJ	New York-Northeastern NJ, Philadelphia
NY	New York-Northeastern NJ, Buffalo
OH	Cincinnati, Cleveland
OR	Portland
PA	Philadelphia, Northeastern PA, Pittsburgh
TX	Dallas-Ft. Worth, Houston
VA	Washington
WA	Seattle-Everett, Portland
WI	Milwaukee, Minneapolis-St. Paul

Note: All types of motor gasoline are included.

unleaded) are first calculated as the simple average of full-service and self-service prices for that product for each month and state. The resulting prices are then weighted into monthly composite prices by using U.S. leaded and unleaded shares of motor gasoline product supplied from the *MER*. The following 26 states have data only from *Platt's*: AL, AR, AZ, CT, DE, IA, ID, LA, ME, MS, MT, NC, ND, NE, NH, NM, NV, OK, RI, SC, SD, TN, UT, VT, WV, and WY.

Platt's reports two prices for each motor gasoline product for each year: one full-service price and one self-service price. These two prices are combined by using a simple average into a single product price for each state for each month.

The unleaded U.S. share of total motor gasoline consumption is reported in the *MER* as 52.1% in 1982. Assuming that the remaining motor gasoline consumption is leaded, the leaded portion of total consumption is 47.9%. These shares are used for all states and months to calculate the composite prices from the leaded and unleaded prices.

For AK and HI, the only states with data only from the *CPI*, the "all types" monthly prices reported are used directly as monthly composite prices.

For states with price data from both *Platt's* and the *CPI*, the *Platt's* data are first combined into product type prices and weighted with the *MER* shares. The resulting combined prices for all motor gasoline types are averaged together, with the combined *CPI* city prices assigned to the respective month and state. The following 23 states have monthly composite prices computed in this way: CA, CO, DC, FL, GA, IL, IN, KS, KY, MA, MD, MI, MN, MO, NJ, NY, OH, OR, PA, TX, VA, WA, and WI.

1. Leaded and unleaded gasoline prices are calculated as simple averages of full-service and self-service prices from *Platt's* and are then weighted into a composite price by using *MER* shares of leaded and unleaded motor gasoline consumption.
2. Monthly "all types" motor gasoline prices covering leaded regular, leaded premium, and unleaded regular are taken directly from the *CPI*. If there is more than one *CPI* price observation for a month and state, the *CPI* prices are simple averages.
3. Using a simple average, the composite *Platt's* prices are combined with the "all types" *CPI* prices for each state. The resulting prices are the monthly composite prices for 1982.

Annual physical unit prices for all states are calculated from the monthly motor gasoline prices calculated above and weighted by the monthly motor gasoline consumption volumes for states from *Highway Statistics*.

Physical unit prices: 1979 through 1981

For 1979 through 1981, *Platt's* monthly motor gasoline prices are taken from a table titled "Platt's/Lundberg Summary." Prices are available for cities by product-type, by grade, and by type of service (full service, self service). Four products and grades of motor gasoline are covered: leaded regular, unleaded regular, leaded premium, and unleaded premium. These data cover 37 states and taxes are included. The *CPI* reports "all types" prices, including taxes, for the cities listed in Table TN4.22. *Platt's* city price assignments to states for 1979 through 1981 are shown in Table TN4.23.

The computation of monthly composite prices for 1979 through 1981 varies, depending on the available data sources for each state. Monthly composite

Table TN4.23. Motor gasoline price assignments from Platt's, 1979 through 1981

State	City price assignments
AL	Birmingham
AZ	Phoenix, Tucson
CA	Bakersfield, Fresno, Los Angeles, Sacramento,
	San Diego, San Francisco, Stockton
CO	Denver
CT	New Haven
DC	Washington
FL	Miami, Tampa- St. Petersburg
GA	Atlanta
IA	Des Moines
ID	Boise
IL	Chicago
IN	Indianapolis
KY	Louisville
LA	New Orleans
MA	Boston
MD	Baltimore
MI	Detroit
MN	Minneapolis
MO	Kansas City, St. Louis
NE	Omaha
NJ	Newark
NM	Albuquerque
NV	Las Vegas, Reno
NY	Long Island, Rochester
OH	Cincinnati
OR	Portland
PA	Philadelphia, Pittsburgh
TN	Memphis
TX	El Paso, Houston
UT	Salt Lake City
VA	Norfolk
WA	Seattle, Spokane
WI	Milwaukee

prices are estimated for the 14 states which do not have reported price data from either data source. If both *Platt's* and the *CPI* report prices for a city, the *CPI* price is used.

1. For states with city price observations only from *Platt's*, prices for leaded and unleaded motor gasoline are combined by use of simple averaging, regardless of the type of service, and are converted to dollars per gallon. The leaded and unleaded prices are then weighted together into a monthly composite price. The following 12 states have prices only from *Platt's* for 1979 through 1981: AL, AZ, CT, IA, ID, LA, NC, NE, NM, NV, TN, and UT.
   a. The *Platt's* prices for 1981 end in September of that year; monthly prices by grade and service type for October, November, and December are assumed to be equal to the corresponding September prices.
   b. Leaded and unleaded prices are calculated for each state by using a simple average of all prices available for each product (leaded, unleaded), regardless of service type or grade of motor gasoline (regular, premium). All city prices for each state are averaged together.
   c. Leaded and unleaded shares of total motor gasoline consumption for the United States are calculated from the *MER* for each year 1979 through 1981. The monthly product type prices are weighted into composite prices by using the national leaded and unleaded shares as weights.
2. For states with city price observations only from the *CPI*, the monthly "all types" prices are used directly for states with only one price observation per month. For states with multiple observations, monthly prices are combined by simple averaging. States with *CPI* data only are: AK, CO, DC, GA, HI, IL, KS, MA, MD, MI, MN, MO, NJ, OH, OR, PA, and WI.
3. For the eight states with price observations from both Platt's and the *CPI* (CA, FL, IN, KY, NY, TX, VA, and WA), monthly composite prices for 1979 through 1981 are calculated by using three steps:
   a. The *Platt's* prices are combined into single "all types" prices as described above by using leaded and unleaded grades of motor gasoline shares as weights.
   b. The *CPI* prices are combined by state.
   c. Using simple averaging, the composite *Platt's* price for each state is combined with the "all types" *CPI* price for that state. The resulting prices are the monthly composite prices for 1979 through 1981.
4. Fourteen states are not covered by price data from either *Platt's* or the *CPI* in 1979 through 1981. These states are AR, DE, ME, MS, MT, ND, NH, OK, RI, SC, SD, VT, WV, and WY. Monthly composite prices for these states are estimated by using the monthly state-level composite prices for 1982 and Census region monthly prices from the *CPI* for 1979 through 1982.

a. The ratio between the 1982 state prices and the 1982 *CPI* Census region prices corresponding to each state is calculated for use as an adjustment factor in 1979, 1980, and 1981.
b. The monthly price for each of the 14 missing states is assumed to be the product of the 1982 Census region adjustment factor for that state times the monthly motor gasoline price for that Census region from the *CPI*.

Annual physical unit prices for all states are calculated from the monthly motor gasoline prices calculated above and weighted by the monthly motor gasoline consumption volumes for states from *Highway Statistics*.

Physical unit prices: 1978

The *Platt's* monthly leaded regular motor gasoline prices cover all states except AK and HI. The *Platt's* city assignments to states are shown in Table TN4.24. In 1978, the *CPI* motor gasoline coverage was expanded from 21 states to 25 states (28 SMSAs) and an "all types" price was published that covers leaded regular, leaded premium, and unleaded regular. The *CPI* SMSA assignments to states for 1978 through 1982 are shown in Table TN4.22 on page 74. Both the *CPI* and the *Platt's* prices include taxes.

Since both sources report a single price for each city or SMSA, product weights are not needed to compute monthly composite prices. Instead, city price observations are assigned to states, as shown in Table TN4.22 and Table TN4.24. Price observations are combined by using simple averaging by state and month. If both *Platt's* and the *CPI* cover a city/SMSA, the *CPI* price is used. *Platt's* prices are converted to dollars per gallon; the *CPI* prices are already expressed in dollars. All states are covered by the data sources, so no imputation is required for 1978. The following 26 states have prices only from *Platt's*: AL, AR, AZ, CT, DE, IA, ID, LA, ME, MS, MT, NC, ND, NE, NH, NM, NV, OK, RI, SC, SD, TN, UT, VT, WV, and WY. The following 19 states are covered only by the CPI: AK, CA, CO, DC, FL, GA, HI, IL, MA, MD, MI, MN, MO, NJ, NY, OH, OR, PA, and WI. Six states have price data from both sources: IN, KS, KY, TX, VA, and WA.

Annual physical unit prices for all states are calculated from the monthly motor gasoline prices calculated above and weighted by the monthly motor gasoline consumption volumes for states from *Highway Statistics*.

Physical unit prices: 1976, 1977

The calculation of monthly composite state prices for 1976 and 1977 depends upon the source of data. Different procedures are used for states with only *Platt's* data, states with only *CPI* data, and states with both *Platt's* and *CPI* data.

Table TN4.24. Motor gasoline price assignments from Platt's, 1970 through 1978

State	City price assignments
AL	Birmingham
AR	Little Rock
AZ	Phoenix
CA	Los Angeles, San Francisco
CO	Denver
CT	Hartford
DC	Washington
DE	Wilmington
FL	Miami
GA	Atlanta
IA	Des Moines
ID	Boise
IL	Chicago
IN	Indianapolis
KS	Wichita
KY	Louisville
LA	New Orleans
MA	Boston
MD	Baltimore
ME	Portland
MI	Detroit
MN	Twin Cities
MO	St. Louis
MS	Jackson
MT	Great Falls
NC	Charlotte
ND	Fargo
NE	Omaha
NH	Manchester
NJ	Newark
NM	Albuquerque
NV	Reno
NY	Buffalo, New York
OH	Cincinnati, Cleveland
OK	Tulsa
OR	Portland
PA	Philadelphia
RI	Providence
SC	Charleston
SD	Huron
TN	Memphis
TX	Dallas, El Paso, Houston
UT	Salt Lake City
VA	Norfolk
VT	Burlington
WA	Seattle, Spokane
WI	Milwaukee
WV	Charleston
WY	Cheyenne

If both data sources cover a city, only the *CPI* price is used for that city. City price assignments to states are given in Table TN4.24 for *Platt's* and in Table TN4.25 for the *CPI*. Prices from both sources include taxes. AK is the only state for which prices need to be estimated.

For states with data from *Platt's* only, the monthly prices reported in *Platt's* are used either directly or combined by simple averaging if there is more than one price observation for a state in a given month. The reported prices in cents per gallon are converted to dollars per gallon.

Prices for the following 29 states are calculated by using this procedure and cover only leaded regular motor gasoline: AL, AR, AZ, CO, CT, DE, FL, IA, ID, LA, ME, MS, MT, NC, ND, NE, NH, NM, NV, OK, OR, RI, SC, SD, TN, UT, VT, WV, and WY.

If state-level motor gasoline prices for 1976 and 1977 are available only from the *CPI*, monthly composite prices are calculated as weighted averages of leaded and unleaded prices. Prices for 15 states are calculated by using data only from the *CPI*: CA, DC, GA, HI, IL, MA, MD, MI, MN, MO, NJ, NY, OH, PA, and WI.

1. The weights used in this process are national-level shares of leaded and unleaded motor gasoline product supplied. For 1977, the leaded and unleaded share of 0.725 and 0.275, respectively, are taken from the *MER*. For 1976, *MER* data for 1977 through 1984 are used to estimate the unleaded share by using simple regression. The unleaded percentages for 1977 through 1984 are converted to shares and used to estimate leaded and unleaded shares of motor gasoline. The resulting 1976 leaded share is 0.744 and the unleaded share is 0.256.
2. The next step is to calculate monthly composite leaded and unleaded prices for each state. If more than one *CPI* price observation is available for a particular grade of motor gasoline (leaded or unleaded) for a state in a given month, the *CPI* observations are combined by grade by using simple averaging. Regular and premium prices are averaged for an estimate of state-level leaded prices.
3. Final monthly composite prices for 1976 and 1977 are calculated by using the leaded and unleaded composite prices calculated above and the *MER*-based leaded and unleaded shares as volume weights.

For states with price data from both *Platt's* and the *CPI,* all price observations are averaged together by product type. If both sources report prices for a city, the *CPI* price is used. Once composite leaded and unleaded prices have been calculated separately for each state, the leaded and unleaded consumption shares are used to weight the product-type prices into the final monthly composite motor gasoline prices. Six states are calculated with data from both *Platt's* and the CPI: IN, KS, KY, TX, VA, and WA.

Table TN4.25. Motor gasoline price assignments from consumer prices: energy, 1974 through 1977

State	City price assignments
CA	Los Angeles-Long Beach, San Diego, San Francisco-Oakland
DC	Washington
GA	Atlanta
HI	Honolulu
IL	Chicago, St. Louis
IN	Cincinnati, Chicago
KS	Kansas City
KY	Cincinnati
MA	Boston
MD	Baltimore, Washington
MI	Detroit
MN	Minneapolis-St. Paul
MO	St. Louis, Kansas City
NJ	New York-Northeastern NJ, Philadelphia
NY	Buffalo, New York-Northeastern NJ
OH	Cincinnati, Cleveland
PA	Philadelphia, Pittsburgh
TX	Dallas, Houston
VA	Washington
WA	Seattle
WI	Milwaukee, Minneapolis-St. Paul

Note: Prices are available separately for leaded regular, leaded premium, and unleaded regular (1976, 1977); "all types" prices are not available.

1. Monthly leaded composite prices are calculated by combining *Platt's* prices with the *CPI* prices for leaded regular and premium motor gasoline by month, since the *Platt's* prices cover only regular leaded fuel. If both data sources cover a city, the *CPI* prices are used.
2. Since the *CPI* is the only source of unleaded gasoline price data for 1976 through 1977, monthly unleaded composite prices are calculated from *CPI* data only.
3. Final monthly composite prices for the six states with price data from both *Platt's* and the *CPI* are calculated by using annual U.S. leaded and unleaded shares and leaded and unleaded monthly composite prices.

Prices for 1976 and 1977 for AK, the only state not covered by price data from either data source, are estimated on the basis of the average relationship between the state and the national average price for years in which data are available. The national average price used for these estimations is a simple

average of the prices of the 49 states for which data are available in all years (i.e., excluding AK and HI for all years). Annual prices for AK are estimated on the basis of the average AK-to-U.S. price relationship for 1978 and 1979.

Annual physical unit prices (excluding AK) are calculated from the monthly motor gasoline prices calculated above and weighted by the monthly motor gasoline consumption volumes for states from *Highway Statistics*.

Physical unit prices: 1974, 1975

The *Platt's* price data for 1974 through 1975 cover only leaded regular motor gasoline. Beginning in 1974, motor gasoline price data are also available from the CPI for selected SMSAs. An SMSA price is assigned to each state with counties included in the definition of that SMSA; for the years 1974 through 1977, prices for 23 SMSAs cover 21 states. The state assignments of SMSA prices for 1974 through 1977 are given in Table TN4.25. For 1974 and 1975, *CPI* prices are reported separately for leaded regular and leaded premium motor gasoline. According to the April 1986 *CPI Detailed Report*, these prices include taxes; the *Platt's* prices also include taxes. AK is the only state not covered by either of these two data sources; prices for AK are imputed for 1974 and 1975.

The *Platt's* regular leaded prices and the CPI regular and premium leaded motor gasoline prices, including taxes, are assigned to their respective states, as shown in Table TN4.24 and Table TN4.25. If both sources cover a city, the CPI price is used. The following 29 states are covered only by *Platt's*: AL, AR, AZ, CO, CT, DE, FL, IA, ID, LA, ME, MS, MT, NC, ND, NE, NH, NM, NV, OK, OR, RI, SC, SD, TN, UT, VT, WV, and WY. The following 15 states are covered only by CPI: CA, DC, GA, HI, IL, MA, MD, MI, MN, MO, NJ, NY, OH, PA, and WI. The following six states have both *Platt's* and *CPI* data for a particular city: IN, KS, KY, TX, VA, and WA.

All price observations assigned to a state, regardless of grade or data source, are added together and divided by the number of observations. As part of this calculation, *Platt's* prices are converted from cents per gallon to dollars per gallon.

Neither *Platt's* nor the *CPI* reports price data for AK. The methodology of the estimation of annual AK prices is the same as used in 1976 and 1977.

Annual physical unit prices for the remaining 50 states (excluding AK) are calculated from the monthly motor gasoline prices calculated above and weighted by the monthly motor gasoline consumption volumes for states from *Highway Statistics*.

Physical unit prices: 1970 through 1973

Monthly motor gasoline physical unit prices for 1970 through 1973 are available only from *Platt's*, where city prices covering 49 states are reported in a table titled "Service Station Prices: Gasoline (Including Taxes)." These prices, as shown in Table TN4.21, are for leaded regular gasoline only and include taxes.

Monthly average city prices from *Platt's* are assigned to the state in which the city is located. *Platt's* city price assignments to states are given in Table TN4.24.

Monthly composite prices for 1970 through 1973 are equal to the reported monthly *Platt's* prices or, if more than one city is available for a given state in a certain month, are a simple average of the assigned city prices. The reported prices are converted from cents to dollars per gallon.

Platt's does not report data for either AK or HI for 1970 through 1973. The methodology of the estimation of AK and HI prices is the same as that used for 1976 and 1977.

Annual physical unit prices (excluding AK and HI) are calculated from the monthly motor gasoline prices weighted by the monthly motor gasoline consumption volumes for states from *Highway Statistics*.

Btu prices: all years

Btu prices for states are computed by converting the physical unit prices in dollars per gallon to dollars per barrel (42 gallons per barrel). The prices are then converted to dollars per million Btu by using the factor 5.253 million Btu per barrel from 1970 through 1992 and a variable annual factor from 1993 forward. U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

2011 forward: EIA, Petroleum & Other Liquids data website, Weekly Retail Gasoline and Diesel Prices, Gasoline – All Grades, http://www.eia.gov/dnav/pet/pet_pri_gnd_a_epm0_pte_dpgal_a.htm .

2010: EIA, Petroleum & Other Liquids data website, Gasoline Prices by Formulation, Grade, Sales Type, Sales to End Users, Average, Through Retail Outlets,http://www.eia.gov/dnav/pet/pet_pri_allmg_a_EPM0_PTC_dpgal_a.htm.

2000-2009: EIA, *Petroleum Marketing Annual*, http://www.eia.gov/oil_gas/

petroleum/data_publications/petroleum_marketing_annual/pma_historical.html, Table 31 (2000-2006), and Table 28 (2007-2009), columns titled "All Grades, Sales to End Users, Through Retail Outlets."

1986-1999: EIA, *Petroleum Marketing Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html, Table 29 (1986-1988) and Table 30 (1989-1993), columns titled "All Refiners, Sales to End Users, Through Company Outlets" and "All Refiners, Sales for Resale," and Table 35 (1994-1999), columns titled "All Grades, Sales to End Users, Through Retail Outlets" and "All Grades, Sales for Resale."

1983-1985: EIA, *Petroleum Marketing Annual 1985*, Volume 1, Table 16, columns titled "All Refiners and Gas Plant Operators, Sales to End Users, Through Company Outlets" and "All Refiners and Gas Plant Operators, Sales for Resale."

1974-1986: Bureau of Labor Statistics, U.S. Department of Labor, *Consumer Prices: Energy*, computer printouts of monthly gasoline prices.

1983-1986: Federal Highway Administration, U.S. Department of Transportation, *Highway Statistics*, Tables MF-26 (1983-1993) and MF-33GA (1994 and 1995).

1970-1982: McGraw-Hill, Inc., *Platt's Oil Price Handbook and Oilmanac*, table titled "AAA 'Fuel-gauge' Report" (1982); table titled "Platt's/Lundberg Summary," (1979-1981); and table titled "Service Station Prices: Gasoline (Including Taxes)," (1970-1978).

1974-1982: Bureau of Labor Statistics, *CPI Detailed Report*, April 1986, Technical Notes, page 110.

1982: EIA, Form EIA-25, "Prime Supplier Monthly Report," computer tape, unpublished data.

1976 through 1984: EIA, *Monthly Energy Review*, January 1985, table titled "Petroleum: Finished Motor Gasoline Supply and Disposition."

Taxes

2000-2010: EIA, *Petroleum Marketing Monthly*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_marketing_monthly/pmm.html, Table EN1, column titled "Motor Gasoline," supplemented with information from state revenue offices and the Federal Highway Administration, U.S. Department of Transportation, *Highway Statistics*, http://www.fhwa.dot.gov/policyinformation/statistics.cfm, Table MF-121T (2000-2006), and Table 8.4.6 (2007—2010).

1983-1999 (State Taxes): Federal Highway Administration, U.S. Department of Transportation, *Highway Statistics*, http://www.fhwa.dot.gov/policyinformation/statistics.cfm, Table MF-121T, supplemented with information from state revenue offices.

1991-2010 (Federal Taxes): EIA, *Petroleum Marketing Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html, Table EN1.

1983-1990 (Federal Taxes): EIA, *Petroleum Marketing Annual*, 1990, Table EN1.

Consumption

1970 forward: EIA, State Energy Data System, transportation sector, motor gasoline consumption.

Conversion factors: all years

1970 forward: EIA, State Energy Data System Consumption Technical Notes, Table B1.

Petroleum Coke

In the State Energy Data System price and expenditure tables, petroleum coke is included in the category "other petroleum products" (see descriptions beginning on page 94).

Petroleum coke is consumed in the commercial, industrial, and electric power sectors. Petroleum refineries used about half of the petroleum coke consumed in the United States. Refinery use is removed from expenditure calculations for all years based on the assumption that the costs are passed on in the prices of the refined petroleum products. (See the discussion in Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.)

Commercial sector

Since 1992, small quantities of petroleum coke have been used for combined-heat-and-power generation in the commercial sector by the University of Northern Iowa. Prices in dollars per million Btu are calculated from data provided by the university and include taxes.

Data Source

Price

1992 forward: University of Northern Iowa, http://www.vpaf.uni.edu/fp/services/powerplant.shtml.

Industrial sector

Petroleum coke is used for combined-heat-and-power (CHP) generation and in manufacturing processes in the industrial sector. The quantities used for CHP are assigned the electric power sector petroleum coke prices in each state. When a state has no electric power petroleum coke consumption, the Census division price or a neighboring state's price is assigned as shown in Table TN4.26.

Petroleum coke used in manufacturing is marketed to industrial consumers in two forms, calcined and uncalcined. Calcined coke is about four times as expensive as uncalcined. A quantity-weighted U.S. average price is calculated by using U.S. Department of Commerce exports data and is assigned to all states with industrial petroleum coke consumption. The weighted average price is calculated by dividing the sum of the values of calcined and uncalcined petroleum coke exports by the sum of the two quantities exported. The exports, reported in metric tons, are converted to short tons by dividing by 0.9071847; are converted from short tons to barrels by multiplying by 5; and are converted from barrels to Btu by multiplying by 6.024. The prices do not include taxes.

Table TN4.26. Industrial sector petroleum coke for CHP price assignments, 1989 forward

State	Years	State or Census division prices assigned
AR	2005	West South Central
	2006	West North Central
CA	1989	West North Central
DE	1993–2003	PA
GA	1990	AL
	1991	East North Central
	1992	West North Central
	1993	KY
	1994–2002, 2011–2014	South Atlantic
	2003–2005	FL
	2006, 2007	South Atlantic (FERC)
	2008–2010	South Atlantic (EIA-923 Sch 2)
IA	2013, 2014	West South Central
IL	1990	IN
	2000, 2001	East North Central
LA	2007	East North Central (FERC)
MI	1989, 1990	IN
	1991–1993	East North Central
MT	1990	West North Central
NJ	2011–2014	East North Central
OK	2010	West South Central (EIA-923 Sch 2)
OH	1989, 1990	IN
	1998, 1999	East North Central
PA	2010	East North Central (EIA-923 Sch 2)
	2011–2014	East North Central
TX	1990–1992	West North Central
	2014	West South Central
WI	1990	IN

Data sources

Price

2013 forward: Census Bureau, U.S. Department of Commerce, domestic exports of Petroleum Coke, Not Calcined, commodity code 2713110000 and

Petroleum Coke, Calcined, commodity code 2713120000, extracted from the U.S. International Trade Commission's Interactive Tariff and Trade DataWeb database, http://dataweb.usitc.gov.

1989-2012: Census Bureau, U.S. Department of Commerce, December issues of EM-545, *Foreign and Domestic Exports*, for Petroleum Coke, Not Calcined, commodity code 2713110000 and Petroleum Coke, Calcined, commodity code 2713120000.

1986-1988: Census Bureau, U.S. Department of Commerce, December issue of EM-546 (1986), EM-622 (1987), EM-522 (1988), *U.S. Exports, Schedule B, Commodity by Country,* Petroleum Coke, Except Calcined, commodity code 5213150, and Petroleum Coke, Calcined, commodity code 5175120.

1978-1985: Census Bureau, U.S. Department of Commerce, FT-446, *U.S. Exports, Schedule B, Commodity by Country*, Petroleum Coke, Except Calcined, commodity code 5213150, and Petroleum Coke, Calcined, commodity code 5175120.

1970-1977: Census Bureau, U.S. Department of Commerce, December issues of FT-410, *U.S. Exports, Schedule B, Commodity by Country*, Petroleum Coke, Except Calcined, commodity code 3329420, and Petroleum Coke, Calcined, commodity code 3329410.

Electric power sector

Petroleum coke is also used for electricity generation in the electric power sector. Estimates of the annual consumption of petroleum coke by the electric power sector are taken from the State Energy Data System (SEDS). The electric power prices for petroleum coke are the average delivered cost of petroleum coke receipts at electric plants. For 1983 through 2009, these data are available from the U.S. Energy Information Administration (EIA) *Cost and Quality of Fuels for Electric Plants (C&Q)*. For 2010 forward, the *C&Q* report is no longer available, but data on the cost of petroleum coke delivered to the electric utilities and/or the electric power sector are available from the Office of Electricity, Renewables, and Uranium Statistics (ERUS). The prices include all taxes, transportation, and other charges paid by the electric plants.

Btu prices: 2002 forward

Electric power sector petroleum coke prices are taken from the EIA *C&Q* or are available from ERUS. From 2008 forward, the data are compiled from the EIA-923, "Power Plant Operations Report." Prior to 2008, the data are compiled from the Federal Energy Regulatory Commission (FERC) Form 423, "Cost and Quality of Fuels for Electric Plants," a survey of electric utilities and the EIA Form-423 "Cost and Quality of Fuels for Electric Plants," a survey of non-utility power producers. The combined information from the Form EIA-423 and FERC Form 423 is used to calculate average delivered costs of petroleum coke used by the entire electric power industry.

Some states have petroleum coke consumption in the electric power sector in SEDS but no deliveries or price data in the C&Q or the ERUS data file. Those states are assigned Census division average prices, or, if the Census division average is not available, they are assigned prices from neighboring states or Census division. For 2003 through 2010, plant-level data from the EIA-923 Schedule 2 data files or the FERC Form 423 data files are also used to calculate prices for a state. If there are no plant data for the state, the plant-level data are used to calculate a price for the Census division. The state level price assignments are shown in Table TN4.27, and the Census division level price assignments are shown in Table TN4.28.

Btu prices: 1972 through 2001

Estimates of the average delivered cost of petroleum coke are based on delivery and cost data from FERC Form 423 data files. From 1972 through 1982, steam plants with a maximum capacity of 25 megawatts were included in the survey. For 1983 and subsequent years, the reporting threshold was raised to 50 megawatts capacity. The FERC Form 423 data files show quantity in short tons, estimated Btu per pound, and price in cents per million Btu. The data are presented by plant, by state, and by month. The Btu price by state is calculated as the annual sum of the unit prices, weighted by the total Btu in each reported delivery, divided by the annual sum of the Btu delivered to all electric plants within the state.

In addition to the computer data files, the data also are published for some years in the EIA *C&Q*. From 1978 through 1982, *C&Q* was published monthly and annually; data for calculating petroleum coke prices are in only the monthly reports. For 1983 through 2001, *C&Q* was published annually and includes petroleum coke prices for individual states and for the nation (the 1994 edition is the last hard copy; all later years are available electronically only).

Some states have petroleum coke consumption in the electric power sector in SEDS but no deliveries or price data in the *C&Q*. Those states are assigned Census division average prices from the *C&Q* or, if the Census division average is not available, they are assigned prices from neighboring states or Census division, as shown in Table TN4.27 and Table TN4.28.

Btu prices: 1970, 1971

Table TN4.27. Petroleum coke electric power sector state price assignments, 1972 through 2010

State	Years	State prices assigned
DE	1981–1992	PA
IA	2008, 2009	EIA-923 Sch 2 data for IA
IN	2009	EIA-923 Sch 2 data for IN
KY	2003	FERC plant data for KY
KS	1975	MO
LA	1990	AL
	1996	FL
	1993–1995, 1997–2002	TX
	2004	FERC plant data for LA
	2008, 2009	EIA-923 Sch 2 data for LA
ME	1996–2000	PA
MI	2004, 2005, 2007	FERC plant data for MI
	2010	EIA-923 Sch 2 data for MI
MO	1983, 1985	MN
	2008	EIA-923 Sch 2 data for MO
MT	1999	UT
	2001	AZ
NC	1997, 1998	FL
NY	1974, 1996, 1998–2000	PA
TX	2004	FERC plant data for TX
WI	1985	MN
	2003–2007	FERC plant data for WI
	2008, 2009	EIA-923 Sch 2 data for WI

For the years 1970 and 1971, prices are estimated by using the gross domestic product implicit price deflator. The deflator for 1970 or 1971 is divided by the 1972 deflator and the quotient is multiplied by the 1972 price for each state to develop the price estimates for 1970 and 1971. The deflators are 35.1 in 1970, 37.1 in 1971, and 38.8 in 1972.

Although SEDS has a consumption estimate for New Jersey in 1971, there are no NJ price data for any year in the FERC Form 423 data files. Form 423 data for Pennsylvania in 1972 are used to estimate a PA price for 1971, which is assigned to NJ. The Form 423 PA prices for 1972 and 1971 are not used in SEDS because the consumption data source has no petroleum coke consumption in PA for those years.

U.S. Btu prices: all years

U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Table TN4.28. Petroleum coke electric power sector Census division price assignments, 1972 forward

State	Year	Census division prices assigned
CA	1990–2009	West North Central
	2012–2014	United States
IA	2012	West South Central
IL	2006, 2007	FERC plant data for East North Central
IN	2013	East North Central
KY	2005–2007	FERC plant data for East North Central
	2008	EIA-923 Sch 2 data for East North Central
LA	1992	West North Central
	2005	West South Central
	2006, 2007	West North Central
ME	1994, 1995	Middle Atlantic
MI	2006	FERC plant data for East North Central
	2008, 2009	EIA-923 Sch 2 data for East North Central
	2011, 2012	East North Central
MN	2009	EIA-923 Sch 2 data for West North Central
MO	2005	West North Central
MT	1995–1998, 2000,	West North Central
	2003–2007, 2011	
	2008–2010	EIA-923 Sch 2 data for West North Central
	2012–2014	West South Central
NY	2001, 2002, 2009,	East North Central
	2011	
	2003, 2005–2008	Mid Atlantic
	2010	EIA-923 Sch 2 data for East North Central
OH	2004–2007	FERC plant data for East North Central
	2008, 2010	EIA-923 Sch 2 data for East North Central
	2009, 2011–2014	East North Central
PA	2001–2003, 2009,	East North Central
	2010	
	2005, 2006, 2008	Mid Atlantic
SC	2008, 2011	EIA-923 Sch 2 data for South Atlantic
TX	2005, 2008–2013	West South Central
	2006, 2007	West North Central

Data sources

Prices

2011 forward: EIA Office of Electricity, Renewables, and Uranium Statistics, data on average delivered cost of petroleum coke by state, electric utilities and electric power sector.

2010: EIA Office of Electricity, Renewables, and Uranium Statistics, data on average delivered cost of petroleum coke by state, all sectors, and Form EIA-923, "Power Plant Operations Report," http://www.eia.gov/electricity/data/eia923/index.html , Schedule 2.

2008-2009: EIA, *Cost and Quality of Fuels for Electric Plants*, Table 9, and Form EIA-923, "Power Plant Operations Report," http://www.eia.gov/electricity/cost_quality/, Schedule 2.

2002-2007: EIA, *Cost and Quality of Fuels for Electric Plants*, Table 9, and FERC Form 423, "Cost and Quality of Fuels for Electric Plants," http://www.eia.gov/electricity/cost_quality/.

1972-2001: EIA, computer data files from FERC Form 423, "Cost and Quality of Fuels for Electric Plants," http://www.eia.gov/electricity/cost_quality/, as published compiled by plant in the following reports:

- 1983-2001: EIA, *Cost and Quality of Fuels for Electric Plants*, Table 20 (1983, 1984), Table 12 (1985-1989), Table 40 (1990, 1991), and Table 28 (1992-2001).
- 1978-1982: EIA, *Cost and Quality of Fuels for Electric Plants,* table titled "Wood Chips, Refuse, and Petroleum Coke Used as Fuel by Steam Electric Units."

1970-1971: EIA, *Annual Energy Review 1992*, Appendix C. Gross Domestic Product and Implicit Price Deflator.

Consumption

1970 forward: EIA, State Energy Data System, electric power sector petroleum coke consumption.

Conversion factors: all years

No conversion factors are required; Btu prices are calculated directly from data sources.

Residual Fuel Oil

Residual fuel oil prices are developed for the industrial, commercial, transportation, and electric power sectors. Estimates of the amount of residual fuel oil consumed by sector are taken from State Energy Data System (SEDS) and are adjusted for process fuel consumption in the industrial sector. (See Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.)

Commercial sector

Commercial sector residual fuel oil prices are estimated by using several different data sources and estimation methodologies, depending on the years involved. For 2011 forward, prices are estimated using regional-level regression equations (see below). For 1984 through 2009, state-level commercial sector residual fuel oil prices are developed from refiner/reseller/retailer prices of residual fuel oil to end users published in the *PMA*. For 2010, PMA is no longer available, but the same set of physical unit prices in dollars per gallon (excluding taxes) are available on the EIA website. For 1970 through 1983, commercial sector residual fuel oil prices are estimated for all states from national-level residual fuel oil prices and the state-level electric power sector residual fuel oil prices. State taxes are included in the final prices for all years.

Physical unit prices: 2011 forward

The survey that provides reseller and retailer prices for sales of residual fuel oil to end users, Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," was discontinued in 2011. As a result, data for residual fuel oil prices, which are based on survey forms EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," and EIA-782B, are no longer available. To estimate residual fuel oil prices, regression equations are developed for each Petroleum Administration for Defense (PAD) district and subdistrict using historical refiner retail sales prices for residual fuel oil from EIA-782A as the independent variable and the historical prices for residual fuel prices for sales to end users as the dependent variable. These regression equations are used to estimate the current residual fuel oil prices for the PAD districts and subdistricts and for states that have historical refiner/reseller/retailer prices and sizable sales volume—CA, DE, LA, MA, MD, NC, NH, NJ, NY, OR, PA, SC, TX, VA, VT, and WA, provided that they have refiner prices. All other states are assigned the corresponding PAD district or subdistrict estimated price. They are shown in Table TN4.29, with the exception of Alaska. Alaska commercial residual fuel oil prices for 1984 forward are based on the Washington commercial residual fuel oil prices and

Table TN4.29. Residual fuel oil commercial sector PAD district and subdistrict price assignments, 1984 forward

State	Years	Assignments
AL	1995, 2006	District 3
AR	1996, 2004	District 3
AZ	1984, 1985, 1988, 1991, 1996	District 5
CO	1986, 1992, 1993, 1998, 1999	District 4
CT	2011–2014	Subdistrict 1A
DC	1998–2001	Subdistrict 1B
DE	2014	Subdistrict 1B
FL	2009, 2011–2014	Subdistrict 1C
GA	2001, 2003, 2014	Subdistrict 1C
HI	2002, 2004–2007	District 5
IA	1996, 1998, 2005, 2006, 2010, 2012	District 2
ID	1985, 1986, 1989–1992, 1994–1998, 2010–2012	District 4
IL	2003, 2008, 2010–2011, 2014	District 2
IN	2009, 2014	District 2
KS	2009–2011	District 2
KY	1999–2001, 2005	District 2
MA	2014	Subdistrict 1A
MD	2014	Subdistrict 1B
ME	2007, 2011–2014	Subdistrict 1A
MI	2008–2014	District 2
MN	1995–1997, 2002–2009, 2011–2014	District 2
MO	1995, 2007, 2009, 2010, 2012	District 2
MS	1988, 1991, 1992, 2001, 2003, 2008	District 3
MT	1992, 1994, 1995, 1997–2000, 2003, 2009, 2010–2014	District 4
NC	2007, 2014	Subdistrict 1C
ND	1988, 1989–1992, 1995–2002, 2005–2009, 2011–2014	District 2
NE	1995, 1998–2000, 2004–2006, 2008–2010, 2012, 2014	District 2
NH	2014	Subdistrict 1A
NM	1984, 1985, 1996	District 3
NV	1986, 1988, 1991, 1992, 1997–2000, 2007, 2011	District 5
OH	2011, 2012	District 2
OK	1992, 1995, 2002, 2004	District 2
OR	1989	District 5
RI	2011–2014	Subdistrict 1A
SC	1993–1995, 1998–2002, 2005–2008, 2014	Subdistrict 1C
SD	1990–1995, 1997–2002, 2004–2013	District 2
TN	1995, 2007–2009, 2013	District 2
UT	1989–1992, 1998–2001, 2004–2006, 2010, 2014	District 4
VA	2014	Subdistrict 1C
VT	2004, 2010, 2014	Subdistrict 1A
WA	2002	District 5
WI	1994, 1995, 1998, 2006–2009	District 2
WV	1984, 2013	Subdistrict 1C
WY	1989–1991, 1994–1998, 2012	District 4

the ratio of the AK-to-WA commercial distillate fuel oil prices for each year where there is consumption. State general sales taxes are added to the state estimated prices.

Physical unit prices: 1984 through 2010

Commercial sector residual fuel oil physical unit prices are based on refiner/reseller/retailer prices to end users. States that do not have refiner/reseller/retailer prices are assigned their PAD district or subdistrict price (Table TN4.29), with the exception of AK. The AK commercial residual fuel oil prices, for years where there is consumption, are based on the WA commercial residual fuel oil price and the ratio of the AK-to-WA commercial distillate fuel oil prices for each year. Tax data are added to develop final prices.

In 2010, refiner/reseller/retailer price for PAD District 4 is not available. It is estimated by calculating the change in price for District 3 from 2009 to 2010 and applying it to the 2009 District 4 price.

Physical unit prices: 1976 through 1983

The commercial sector residual fuel oil physical unit prices for 1976 through 1983 are estimated from the electric power sector residual fuel oil prices and the U.S. average retail residual fuel oil prices (with taxes added) for each year. The resulting price estimates implicitly include taxes that reflect individual state differences.

1. The first step in the estimation of the commercial residual fuel oil physical unit state prices is to convert the state-level tax rates reported in the U.S. Census Bureau publications into the volume-weighted average U.S. sales tax rate by using commercial residual consumption data from SEDS.
2. A preliminary U.S. residual fuel oil price, including taxes, is computed by using the average U.S. tax rate estimated above and the annual average U.S. residual fuel oil price to end users (average retail price excluding taxes) from the *Monthly Energy Review* (MER).
3. Commercial sector physical unit residual fuel oil prices for states are computed by using the electric power sector residual fuel oil prices. To do this calculation, the ratio of the state-level and U.S. prices in the commercial sector is assumed to be the same as the ratio of state and U.S. prices in the electric power sector. Some states are missing electric power sector prices for 1976 through 1983; these are estimated by using adjacent states' average prices (Table TN4.30).

Physical unit prices: 1970 through 1975

Table TN4.30. Residual fuel oil commercial sector price assignments, 1970 through 1983

State	Years	State prices used in the estimation
AL	1970–1974, 1980, 1982, 1983	FL, GA, MS
ID	1980, 1981, 1983	CA, CO
	1982	CA
IN	1980–1983	IL, MI, OH
KY	1980–1983	IL, MO, OH, VA
MT	1980, 1983	CO, MN
	1982	MN
NC	1981, 1983	GA, VA
ND	1980, 1983	MN, SD
	1981, 1982	MN
OR	1975–1983	CA
TN	1970–1978, 1980–1983	AR, GA, MO, MS, VA
VT	1980–1983	ME, NH, NY
WI	1982, 1983	IL, MI, MN
WV	1980–1983	MD, OH, PA, VA
WY	1980	CO, NE, SD, UT
	1981, 1983	CO
	1982	MN

Because no national or state-level retail residual prices are available from published data sources, commercial sector residual prices for 1970 through 1975 are estimated. The estimation method is based on the assumption that the average ratio of state-to-U.S. prices is the same in the commercial and electric power sectors. The average ratio for 1976 through 1979 of the *MER* U.S. tax-adjusted prices to the electric power sector U.S. prices is calculated and used as an adjustment factor with state-level electric power sector prices for 1970 through 1975. The resulting price estimates implicitly include taxes that reflect individual state differences.

1. The average ratio of the *MER* tax-adjusted U.S. prices and the electric power sector U.S. prices is calculated for 1976 through 1979.
2. State-level commercial sector residual fuel oil prices are calculated by using the electric power sector physical unit price series for 1970 through 1975 and the average ratio computed above. Price assignments for states missing electric power sector data are shown in Table TN4.30.

Btu prices: all years

Btu prices for states are calculated from the physical unit prices and the conversion factor. U.S. Btu prices are calculated as the average of the state

Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

2011 forward: Unpublished price data from EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report."

2010: EIA, Petroleum & Other Liquids data website, Residual Fuel Oil Prices by Sales Type, Sales to End Users, http://www.eia.gov/dnav/pet/pet_pri_resid_a_eppr_pta_dpgal_a.htm.

1984-2009: EIA, *Petroleum Marketing Annual*, http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html, Table A3, column titled "Residual Fuel Oil-Sales to End Users."

1984-1988: Commercial sector distillate fuel oil price estimates from SEDS (AK and WA only).

1978-1983: EIA, *Monthly Energy Review, December 1988*, table titled "Refiner Sales Prices of Residual Fuel Oil," column titled "Average Sales to End Users."

1976, 1977: EIA, *Monthly Energy Review, December 1983*, table titled "Average No. 6 Residual Fuel Oil Prices," column titled "Average, Retail."

1970-1983: Electric power sector residual fuel oil price estimates (in physical units) from SEDS.

Taxes

For 1992 forward, an annual average general sales tax is calculated for each state as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the state general sales tax as of September 1 of each year is used.

For 2009, the Federation of Tax Administrators did not publish state general sales tax data, but did publish state general sales tax data for 2010. Therefore, the 2009 tax rates were estimated by comparing the Federation of Tax Administrators' 2008 and 2010 rates for each respective state. If no change occurred between 2008 and 2010, it has been assumed the rate remained constant in 2009. If a rate did change between those years, the State Department of Revenue was consulted to determine the effective date of the rate change to be used in the 2009 estimates accordingly.

1996 forward: Federation of Tax Administrators, http://www.taxadmin.org/current-tax-rates.

1995: The Council of State Governments, *The Book of the States 1994-95* and *1996-97,* Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism,* Tables 14 and 26.

1993: Census Bureau, U.S. Department of Commerce, *State Tax Review,* Volume 54, No. 31, map titled "State Gasoline, Sales, and Cigarette Tax Rates as of July 1, 1993," sales tax rates.

1987-1992: Census Bureau, U.S. Department of Commerce, *State Government Tax Collections,* Table 8, column titled "Percentage rate, September 1."

1976-1986: Census Bureau, U.S. Department of Commerce, *Statistical Abstract of the United States,* table titled "State Government Tax Collections and Excise Taxes," column titled "Excise Taxes, General sales and gross receipts."

Consumption

1970 forward: EIA, State Energy Data System (SEDS), commercial sector residual fuel oil consumption.

Conversion factor: all years

6.287 million Btu per barrel.

Electric power sector

The electric power price for residual fuel oil (heavy oil) is the average delivered cost of No. 6 fuel oil receipts at electric plants. For 1973 forward, Btu prices are developed directly from the data sources. For 1970 through 1972, prices are estimated by using simple regression analysis. All taxes, transportation, and other charges paid by the power plants are included in the prices for all years.

Btu prices: 2011 forward

Data on the cost of residual fuel oil delivered to the electric utilities are no longer published, but they are available from the Office of Electricity, Renewables, and Uranium Statistics (ERUS). Not all state-level prices are available. Missing state prices are estimated by applying the growth rate of the U.S. price to the previous year's state prices (Table TN4.31).

Btu prices: 1973 through 2010

Electric power sector residual fuel oil prices for 1973 through 2009 are taken from the U.S. Energy Information Administration (EIA) Cost and Quality of Fuels for Electric Plants (*C&Q*). For 2010, *C&Q* is no longer available, but data on the cost of residual fuel oil delivered to the electric utilities are available

Table TN4.31. Residual fuel oil electric power U.S. growth assignments, 2011 forward

State	Years	State	Years
AK	2013, 2014	ME	2011–2014
AR	2011–2014	MI	2011–2014
CA	2011	MS	2011, 2012, 2014
CT	2011–2014	NE	2011, 2012
DE	2011–2014	NH	2011, 2012
GA	2011	NJ	2011–2014
LA	2012–2014	PA	2011–2014
MA	2011, 2013, 2014	TX	2011, 2012
MD	2011–2014	VT	2011, 2012

from ERUS.

For 1973 through 1979, British thermal unit (Btu) prices are calculated as the weighted average of contract and spot prices for No. 6 fuel oil. For 1980 through 1982, *C&Q* prices cover all reporting plants of 25 megawatts capacity or greater. For 1983 forward, *C&Q* reports prices for steam electric plants of 50 megawatts capacity or greater.

Not all state-level prices are available from the source. The corresponding Census division price, either available from source or estimated as described in Table TN4.32, is assigned as the state prices. Table TN4.33 lists the states and years for which Census division prices are assigned as the state prices.

Alaska: 1973 through 2007

C&Q does not have prices for AK from 1973 through 2007. For 1973 through 1993, prices are estimated by calculating the ratio of the AK price to the U.S. price from the *Statistical Yearbook of the Electric Utility Industry* and multiplying the ratio by the *C&Q* U.S. price for each year. AK prices for 1973, 1975, and 1978 are not published in the *Statistical Yearbook* and are estimated by calculating an average of the ratios of the AK to U.S. prices in adjacent years. The 1973 estimated price is based on the average ratio for 1972 and 1974; the 1975 price is based on the average ratio for 1974 and 1976; and the 1978 price is based on the average ratio for 1977 and 1979. The average ratio is then applied to the U.S. *C&Q* price for the missing year. Beginning with 1994 data, the *Statistical Yearbook* table was discontinued. Alaska prices for 1994 through 2007 are obtained from direct contact with the only Alaskan power plant reporting use of residual fuel oil.

Hawaii: 1973 through 1982, and 2007

C&Q does not have prices for HI from 1973 through 1982. Prices are estimated by calculating the ratio of the HI price to the U.S. price from the *Statistical Yearbook of the Electric Utility Industry* and multiplying the ratio by the *C&Q* U.S. price for each year. In 2007, plant data from FERC Form 1 are used to calculate the state price.

Table TN4.32. Residual fuel oil electric power Census division price estimation methods, 1970 through 2010

Census division/subdivision	Years	Estimation method
West North Central	2007, 2010	Growth rate of U.S. price
Mountain	1996–2002	Average difference between Mountain and Pacific Noncontinguous prices for 1991-1995 applied to 1996-2002 Pacific Noncontiguous prices
	2007–2010	Growth rate of U.S. price
Pacific Contiguous	1995, 1996	1994 California price
	1997–2000	Average prices for California electric power plants reported on FERC Form 1
	2004	Growth rate of Mountain price
	2007, 2010	Growth rate of U.S. price
Pacific	2002, 2003	Growth rate of Pacific Continguous price
Noncontiguous	2004–2006	Growth rate of Mountain price
	2007	Growth rate of U.S. price

Btu prices: 1970 through 1972

State-level Btu prices for 1970 through 1972 are estimated by using regression techniques and price data from the *Statistical Yearbook*. The regression equations use *Statistical Yearbook* state-level prices for 1973 through 1980 as the independent variable and the state-level prices calculated above (including the estimations for AK and HI) as the dependent variable. Pacific regional price averages are assigned for the missing WA prices in 1970 and 1971. The average of 1970 and 1972 AK *Statistical Yearbook* prices is substituted for the missing 1971 AK price.

U.S. Btu prices: all years

U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

2010 forward: EIA, Office of Electricity, Renewables, and Uranium Statistics, data on average delivered cost of residual fuel oil to regulated electric power plants.

Table TN4.33. Residual fuel oil electric power Census division price assignments, 1970 through 2010

State	Years of Assigned Prices	Census division
AL	1975–1979	East South Central
AR	1987, 1992, 1993, 1996–2003, 2005, 2007	West South Central
AZ	1984, 1985, 1991–1997, 1999–2001	Mountain
CA	2007, 2010	Pacific Contiguous
CO	1982, 1987, 1989–1992, 1994, 1995–2001, 2009	Mountain
CT	2001–2010	New England
DC	1982–2001	South Atlantic
DE	2007–2010	South Atlantic
GA	1991, 1998–2002, 2007–2008	South Atlantic
HI	2002–2006	Pacific Non-Contiguous
IA	1970–1985	West North Central
IL	2000, 2003–2010	East North Central
IN	1970–1979, 1995, 2001–2002	East North Central
KS	1980, 1981, 1985–1987, 1989–1992, 1995	West North Central
KY	1970–1979	East South Central
MD	2001–2007	South Atlantic
ME	2001–2010	New England
MN	1984, 1985, 1987–1990, 1992, 1993, 1996–2002, 2007	West North Central
MO	1999, 2001, 2002, 2004	West North Central
MT	1970–1979	Mountain
NC	1976, 1977, 1979, 1980, 1982, 1984	South Atlantic
ND	1970–1979, 2002	West North Central
NE	1981–1983, 1990, 1991, 1994, 1998–2007, 2010	West North Central
NM	1979–1982, 1989–1997, 2001, 2004	Mountain
NV	1983, 1985, 1996–2002, 2007	Mountain
OH	1992–1994, 2001, 2002, 2004	East North Central
OK	1977, 1978, 1980, 1982–1987, 1989, 1991–1997, 1999, 2001, 2002, 2006, 2007	West South Central
OR	1970, 1973, 1974	Pacific
PA	2002–2010	Mid-Atlantic
RI	1995	New England
SC	1983, 1985–2002, 2007–2010	South Atlantic
SD	1981–1988	West North Central
TN	1979	East South Central
TX	1992–1997, 1999–2002, 2007, 2008	West South Central
UT	1982, 1983, 1986	Mountain
VT	1970–1979, 2008, 2009	New England
WA	1970, 1971, 1975–1978, 1981–1983, 1986–1988	Pacific
WA	1992, 1993	Pacific Contiguous
WI	2001	East North Central
WV	1970–1977, 1979	South Atlantic
WY	1970–1979	Mountain

1973-2009: EIA, *Cost and Quality of Fuels for Electric Plants,* Table 6 (1973-1979), Table 45 (1980-1982), Table 51 (1983, 1984), Table 41 (1985-1989), Table 14 (1990, 1991), and Table 8 (1992-2001), Table 7.D (2002, 2003), Table 7.C (2004-2008), and Table 11 (2009). Data from 1990 forward are also available at http://www.eia.gov/electricity/cost_quality/.

1994-2007: Alaska prices are obtained from the Golden Valley Electric Association.

1970-1993: Edison Electric Institute, *Statistical Yearbook of the Electric Utility Industry*, Table 43 (1970-1979), Table 26 (1980-1983), Table 28 (1984-1986), and Table 29 (1987-1993).

Consumption

1970 forward: EIA, State Energy Data System, electric power sector residual fuel oil consumption.

Conversion factors: all years

Because Btu prices are available directly from the data sources, no conversion factors are used, with the exception of Alaskan prices for 1994 forward, which use 6.287 million Btu per barrel.

Industrial sector

Industrial sector residual fuel oil prices are estimated by using several different data sources and estimation methodologies, depending on the years involved. For 2011 forward, prices are estimated using regional-level regression equations (see below). Prices for 1984 through 2009 are developed from refiner/reseller/retailer prices of residual fuel oil as published in the *Petroleum Marketing Annual (PMA)*. For 2010, *PMA* is no longer available, but the same set of physical unit prices in dollars per gallon (excluding taxes) are available on the EIA website**.** Residual fuel oil prices for 1970 through 1983 are calculated or estimated by using average costs of residual fuel oil to manufacturing firms published in two U.S. Census Bureau reports and *Platt's Oil Price Handbook and Oilmanac*. Price data in these sources are available for the years 1971 and 1974 through 1981; prices for 1970, 1972, 1973, 1982, and 1983 are estimated. Prices for all years include taxes.

Physical unit prices: 2011 forward

The survey that provides reseller and retailer prices for sales of residual fuel oil to end users, Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," was discontinued in 2011. As a result, data for residual fuel oil prices, which are based on survey forms EIA-782A, "Refiners'/Gas

Plant Operators' Monthly Petroleum Product Sales Report," and EIA-782B, are no longer available. To estimate residual fuel oil prices, regression equations are developed for each Petroleum Administration for Defense (PAD) district and subdistrict using historical refiner retail sales prices for residual fuel oil from EIA-782A as the independent variable and the historical prices for residual fuel prices for sales to end users as the dependent variable. These regression equations are used to estimate the current residual fuel oil prices for the PAD districts and subdistricts and for states that have historical refiner/reseller/retailer prices and sizable sales volume—CA, DE, LA, MA, MD, NC, NH, NJ, NY, OR, PA, SC, TX, VA, VT, and WA, provided that they have refiner prices. All other states are assigned the corresponding PAD district or subdistrict estimated price. They are shown in Table TN4.34, with the exception of Alaska. Alaska industrial residual fuel oil prices for 1984 forward are based on the Washington industrial residual fuel oil prices and the ratio of the AK-to-WA industrial distillate fuel oil prices for each year where there is consumption. State general sales taxes are added to the state estimated prices.

Physical unit prices: 1984 through 2010

Residual fuel oil industrial sector physical unit prices are calculated by using refiner/reseller/retailer prices to end users. The states that do not have refiner/reseller/retailer prices are assigned their PAD district or sub-district price as shown in Table TN4.34, with the exception of Alaska. Alaska industrial residual fuel oil prices for 1984 forward are based on the Washington industrial residual fuel oil prices and the ratio of the AK-to-WA industrial distillate fuel oil prices for each year where there is consumption. State general sales taxes are added.

In 2010, refiner/reseller/retailer price for PAD District 4 is not available. It is estimated by calculating the change in price for District 3 from 2009 to 2010 and applying it to the 2009 District 4 price.

Physical unit prices: 1982, 1983

After 1981, the U.S. Department of Commerce's *Annual Survey of Manufactures* and the *Census of Manufactures (ASM/CM)* ceased publication of fuel-specific state-level residual fuel oil data from which prices can be calculated. Prices for 1982 and 1983 are estimated from the average relationship between the *ASM/CM*-based prices generated for 1978 through 1981 and the assigned *Platt's* No. 6 fuel oil prices for 1978 through 1981 (Table TN4.35). These average ratios are calculated at the state-level for all states except AK, which shows no industrial sector residual fuel oil use reported in SEDS for 1982 and 1983. Physical unit residual fuel oil industrial prices for 1982 and 1983 are calculated

Table TN4.34. Residual fuel oil industrial sector PAD district and subdistrict price assignments, 1984 forward

State	Years	Assignments
AL	1995, 1997, 1998, 2005–2014	District 3
AR	1985, 1996, 1997–2014	District 3
AZ	1984–1993, 1995–2002, 2005–2007, 2011	District 5
CO	1986, 1988, 1990–1995, 1997–1999, 2001, 2006, 2008	District 4
DC	1994, 1995, 2000	Subdistrict 1B
FL	2009, 2011–2014	Subdistrict 1C
GA	2001–2004, 2011–2014	Subdistrict 1C
HI	2002–2008, 2011–2013	District 5
IA	1995–1999, 2005–2008, 2010–2014	District 2
ID	1985, 1986, 1989–1992, 1994, 1995–2003, 2005–2007, 2009–2012	District 4
IL	2003–2004, 2007–2014	District 2
IN	2009–2014	District 2
KS	2007–2014	District 2
KY	1998–2010, 2013, 2014	District 2
MA	2014	Subdistrict 1A
MD	2014	Subdistrict 1B
ME	2007, 2011–2014	Subdistrict 1A
MI	2007–2014	District 2
MN	1995–1997, 2002–2009, 2011–2014	District 2
MO	1995, 2007, 2010–2014	District 2
MS	1988, 1991, 1992, 1995, 1998, 2001–2004, 2006–2014	District 3
MT	1992, 1994, 1995, 1997–1999, 2001–2006, 2009	District 4
NC	2007, 2014	Subdistrict 1C
ND	1988–1992, 1995–2002, 2005–2009, 2011, 2012, 2014	District 2
NE	1995, 1996, 1998–2000, 2002, 2005–2009, 2014	District 2
NH	2014	Subdistrict 1A
NM	1984–1986, 1990–2010	District 3
NV	1986, 1988, 1991–1999, 2002–2006	District 5
OH	2011–2014	District 2
OK	1992–2014	District 2
OR	1989	District 5
SC	1993–1995, 1998–2002, 2005–2008, 2014	Subdistrict 1C
SD	1990–2009, 2011, 2013, 2014	District 2
TN	1995, 2000, 2002, 2007–2009, 2011–2014	District 2
UT	1989–1992, 1998–2000, 2002, 2005, 2006, 2008, 2010, 2014	District 4
VA	2014	Subdistrict 1C
VT	2010, 2014	Subdistrict 1A
WA	2002	District 5
WI	1994, 1995, 1998, 2006–2014	District 2
WV	1984, 1998, 2002–2014	Subdistrict 1C
WY	1989–1999, 2001–2010	District 4

Table TN4.35. No. 6 Fuel oil price assignments from Platt's, 1970 through 1983

State	Years	City or state prices assigned	State	Years	City or state prices assigned
AK	1970–1972, 1975, 1977–1980	Los Angeles, CA	MT	1970–1983	Minneapolis/St. Paul, MN
	1973–1974, 1976,	Los Angeles/San Francisco, CA	NC	1970–1983	Wilmington
	1981–1983	Los Angeles, CA; San Francisco, CA	ND[1]	1970–1983	Minneapolis/St. Paul, MN
AL	1970–1983	Savannah, GA	NE	1970–1972, 1975, 1977–1980	Los Angeles, CA
AR	1970–1983	Arkansas		1973, 1974, 1976	Los Angeles/San Francisco, CA
AZ	1970–1972, 1975, 1977–1980	Los Angeles, CA		1981–1983	Los Angeles, CA; San Francisco, CA
	1973–1974, 1976	Los Angeles/San Francisco, CA	NH	1970–1983	Portland, ME
	1981–1983	Los Angeles, CA; San Francisco, CA	NJ	1970–1972	New Jersey
CA	1970–1972, 1975, 1977–1980	Los Angeles		1974, 1975	New York, NY; Albany, NY; Buffalo, NY
	1973–1974, 1976	Los Angeles/San Francisco		1976–1983	New York, NY; Albany, NY
	1981–1983	Los Angeles; San Francisco	NM	1970–1972, 1975, 1977–1980	Los Angeles, CA
CO[1]	1970–1983	Minneapolis/St. Paul, MN		1973, 1974, 1976	Los Angeles/San Francisco, CA
CT	1970–1983	New Haven		1981–1983	Los Angeles, CA; San Francisco, CA
DC	1970–1983	Baltimore, MD	NV	1970–1972, 1975, 1977–1980	Los Angeles, CA
DE	1970–1983	Baltimore, MD		1973, 1974, 1976	Los Angeles/San Francisco, CA
FL	1970–1972	Jacksonville; Miami; Tampa;		1981–1983	Los Angeles, CA; San Francisco, CA
		Port Everglades	NY	1970–1975	New York; Albany; Buffalo
	1973–1975	Jacksonville; Miami; Tampa		1976–1983	New York; Albany
	1976–1983	Jacksonville/Miami	OH[1]	1976–1983 1970	Toledo
GA	1970–1983	Savannah		1971–1983	Detroit, MI
HI	1970–1972, 1975, 1977–1980	Los Angeles, CA	OK[2]	1970–1977, 1979	Group 3 (Oklahoma)
	1973, 1974, 1976	Los Angeles/San Francisco, CA		1978, 1980–1983	New Orleans, LA
	1981–1983	Los Angeles, CA; San Francisco, CA	OR	1970–1972, 1975, 1977–1980	Los Angeles, CA
IA[1]	1970–1983	Chicago, IL		1973, 1974, 1976	Los Angeles/San Francisco, CA
ID	1970–1972, 1975, 1977–1980	Los Angeles, CA		1981–1983	Los Angeles, CA; San Francisco, CA
	1973, 1974, 1976	Los Angeles/San Francisco, CA	PA	1970–1983	Philadelphia
	1981–1983	Los Angeles, CA; San Francisco, CA	RI	1970–1975	Providence
IL[1]	1970–1983	Chicago		1976–1983	New Haven, CT
IN[1]	1970–1983	Chicago, IL	SC	1970–1983	Charleston
KS	1970	Baton Rouge, LA; New Orleans, LA	SD[1]	1970–1983	Minneapolis/St. Paul, MN
	1971–1983	New Orleans, LA	TN	1970	Baton Rouge, LA; New Orleans, LA
KY	1970	Baton Rouge, LA; New Orleans, LA		1971–1983	New Orleans, LA
	1971–1983	New Orleans, LA	TX	1970–1972	New Mexico/West Texas
LA	1970	Baton Rouge; New Orleans		1973–1983	New Orleans, LA
	1971–1983	New Orleans	UT[1]	1970–1983	Minneapolis/St. Paul, MN
MA	1970–1983	Boston	VA	1970–1983	Norfolk
MD	1970–1983	Baltimore	VT	1970–1983	Portland, ME
ME	1970–1983	Portland	WA	1970–1972, 1975, 1978, 1979	Los Angeles, CA
MI[1]	1970–1983	Detroit		1973, 1974, 1976	Los Angeles/San Francisco, CA
MN[1]	1970–1983	Minneapolis/St. Paul		1980–1983	Seattle/Tacoma
MO[1]	1970–1973	Chicago, IL	WI[1]	1970–1983	Chicago, IL
	1974–1983	St. Louis	WV	1970–1983	Norfolk, VA
MS	1970	Baton Rouge, LA; New Orleans, LA	WY[1]	1970–1983	Minneapolis/St. Paul, MN
	1971–1983	New Orleans, LA			

[1]Data from Platt's are converted from cents per gallon to dollars per barrel.

[2]As shown in Platts.

by using the assigned *Platt's* prices for 1982 and 1983 (Table TN4.35) and the state-level average ratios. The resulting estimates implicitly include taxes that reflect individual state differences.

Physical unit prices: 1971, 1974 through 1981

For the years 1971 and 1974 through 1981, industrial sector residual prices are calculated directly from cost and quantity data reported by the *ASM/CM*. For all states with available cost and quantity data, prices are equal to the average cost of residual fuel oil to manufacturers. Taxes are included in the published cost data. Missing data for these years are assigned from the average prices of adjacent states, as shown in Table TN4.36.

Physical unit prices: 1970, 1972, 1973

Since *ASM/CM* data are not available for 1970, 1972, or 1973, prices for these years must be estimated. Physical unit prices are based on the ratio of the 1971 *CM* prices to the 1971 assigned No. 6 fuel oil prices from *Platt's Oil Price Handbook and Oilmanac* (Table TN4.35). The estimated 1971 *CM* prices for NM and WY are used in the calculations. The resulting ratios for each state are used with the *Platt's* assigned prices for 1970, 1972, and 1973 to estimate prices. The final estimates implicitly include state-specific taxes.

Btu prices: all years

Btu prices for states are calculated from the physical unit prices and the conversion factor of 6.287 million Btu per barrel. U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS, which are adjusted for process fuel consumption.

Data sources

Prices

2011 forward: Unpublished price data from EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report."

2010: EIA, Petroleum & Other Liquids data website, Residual Fuel Oil Prices by Sales Type, Sales to End Users, http://www.eia.gov/dnav/pet/pet_pri_resid_a_eppr_pta_dpgal_a.htm.

1984 forward: EIA, *Petroleum Marketing Annual,* http://www.eia.gov/oil_gas/petroleum/data_publications/petroleum_marketing_annual/pma_historical.html, Table A3, column titled "Residual Fuel Oil-Sales to End Users."

1984 forward: Industrial sector distillate fuel oil price estimates from *SEDS* (AK and WA only).

Table TN4.36. Residual fuel oil industrial sector price assignments, 1971, 1974 through 1981

State	Years	State prices used
AK	1980, 1981	HI, WA
DC	1979–1981	MD, VA
MT	1974–1979	ID, ND, SD
ND	1980	MN, MT, SD
NM	1971, 1974–1981	AZ, CO, TX
NV	1974–1978	AZ, CA, ID, OR, UT
OK	1974–1978, 1980	AR, CO, KS, MO, TX
SD	1981	IA, MN, MT, ND, NE
WY	1971, 1974–1981	CO, NE, UT

1970-1983: McGraw-Hill, Inc., *Platt's Oil Price Handbook and Oilmanac*, refinery and terminal prices for No. 6 fuel oil, average of highs and lows.

1971, 1977, 1981: Census Bureau, U.S. Department of Commerce, *Census of Manufactures, Fuels and Electric Energy Consumed*, Part 2, Table 3. (Dates shown on the report covers are, respectively, 1972, 1977, and 1982.)

1974-1976 and 1978-1980: Census Bureau, U.S. Department of Commerce, *Annual Survey of Manufactures, Fuels and Electric Energy Consumed, States by Industry Group*, Table 3.

Taxes

For 1992 forward, an annual average general sales tax is calculated for each state as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the state general sales tax as of September 1 of each year is used.

For 2009, the Federation of Tax Administrators did not publish state general sales tax data, but did publish state general sales tax data for 2010. Therefore, the 2009 tax rates were estimated by comparing the Federation of Tax Administrators' 2008 and 2010 rates for each respective state. If no change occurred between 2008 and 2010, it has been assumed the rate remained constant in 2009. If a rate did change between those years, the State Department of Revenue was consulted to determine the effective date of the rate change to be used in the 2009 estimates accordingly.

1996 forward: Federation of Tax Administrators, http://www.taxadmin.org/current-tax-rates.

1995: The Council of State Governments, *The Book of the States 1994-95* and *1996-97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism,* Tables 14 and 26.

1993: Census Bureau, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled "State Gasoline, Sales, and Cigarette Tax Rates as of July 1, 1993," sales tax rates.

1987-1992: Census Bureau, U.S. Department of Commerce, *State Government Tax Collections,* Table 8, column titled "Percentage rate, September 1."

1984-1986: Census Bureau, U.S. Department of Commerce, *Statistical Abstract of the United States*, table titled "State Government Tax Collections and Excise Taxes," column titled "Excise Taxes, General sales and gross receipts."

Consumption

1970 forward: EIA, State Energy Data System, industrial sector residual fuel oil consumption.

Conversion factor: all years

6.287 million Btu per barrel.

Transportation sector

Residual fuel oil is consumed in the transportation sector for vessel bunkering, military use, and railroads. In 1970, vessels consumed 74% of the transportation use of residual fuel oil, and the military and railroads accounted for 24% and 2%, respectively. By the mid-1990s, vessel use had grown to over 99% of all transportation consumption. Prices are developed for vessel bunkering, and electric power sector prices are assigned to the military and railroad uses for all years. Tax adjustments are made as described below. The transportation sector average price for each state and year is the consumption-weighted average of the prices of the three uses.

Physical unit prices: all years

Vessel bunkering. Physical unit prices are calculated from actual or estimated U.S. average bunker C prices and electric power sector state and U.S. residual fuel oil prices for each year. The ratio of U.S. bunker C price to U.S. residual fuel oil electric power price is multiplied by the state electric power residual fuel oil price to obtain the estimated state bunker C price. Taxes are calculated for all years, as described for the commercial sector in 1976 through 1983, and added to the U.S. bunker C price, so that final state vessel bunkering price implicitly estimates taxes. Other procedures are described separately by groups of years:

1. For 1982 forward, national average prices for residual fuel oil with sulfur content greater than 1% are taken from the *Annual Energy Review* and are used as proxies for bunker C prices.
2. For 1975 through 1981, national average bunker C prices are available from the *Monthly Petroleum Product Price Report (MPPPR)*. Annual average U.S. prices for 1975 and 1976 are calculated as the simple average of the monthly prices for each respective year because annual average prices are not shown in the *MPPPR*.
3. For 1970 through 1974, no U.S. bunker C prices are available. To estimate state-level prices for these years, the average ratio of published bunker C prices and electric power sector prices for 1975 through 1979 is calculated and multiplied by the state-level electric power prices for 1970 through 1974.

Missing state prices are assigned adjacent states' average prices from 1970-1986, as shown in Table TN4.37.

Military and railroad use. For all years, electric power sector residual fuel oil prices are assigned to military and railroad uses. The electric power prices include taxes. Since the military does not pay state taxes, the electric power prices are adjusted to remove taxes.

In some cases, states have no residual fuel oil price reported for the electric power sector. Electric power Census division prices are assigned to those states that need prices for use in the transportation sector for 1987 forward and for OR in 1971.

Average prices. Transportation sector prices are the average of bunker fuel, military, and railroad prices weighted by each category's share of total transportation consumption from SEDS.

Btu prices: all years

Btu prices for states are calculated from the physical unit prices and the residual fuel oil conversion factor. U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS.

Data sources

Prices

2011 forward: EIA, *Petroleum Market Monthly, April issues,* Table 16, column titled "Sulfur Greater Than 1%, Sales to end users." Also available at http://www.eia.gov/dnav/pet/pet_pri_refoth_dcu_nus_a.htm.

1982-2010: EIA, *Annual Energy Review,* http://www.eia.gov/aer/contents.

Table TN4.37. Residual fuel oil transportation sector price assignments, 1970 through 1986

State	Years	State prices used in the estimation
AL	1970–1974, 1980–1986	FL, GA, MS
CO	1986	KS, NM, UT
CT	1978	NH, VT
DC	1975	MD
	1978	PA
GA	1978	KY, MS
ID	1970, 1979	CA, CO
IL	1975	IA, IN, WI
IN	1980–1986	IL, MI, OH
KS	1975	MO, NE
KY	1980–1984	IL, MO, OH, VA
MD	1978	DE, PA
ME	1975	VT
MN	1986	IL, MI
MT	1983–1985	CO, MN, SD
NC	1975	GA
	1978	KY
	1981, 1983, 1985, 1986	GA, VA
ND	1982–1984	MN, SD
	1986	SD
NH	1975	VT
NM	1983, 1984	CO
NV	1975, 1978	CA
OH	1975	IN, MI
OK	1975	MO, TX
OR	1972	CA, WA
	1975–1986	CA
SC	1975, 1984	GA
	1978	AL, FL
SD	1975, 1978	MN, ND
TN	1970, 1971, 1973, 1974, 1976,	AR, GA, MO, MS, VA
	1977, 1980–1982	
	1975	AR, GA, MO, MS
	1978	AR, MO, MS
UT	1984	AZ, CO, NV
	1975	CO
VA	1975	GA
	1978	KY
WA	1984, 1985	CA
WI	1978, 1982–1985	IL, MI, MN
	1986	IL, MI
WV	1985	MD, OH, PA, VA
WY	1981, 1982, 1985	CO, MN, SD

html, Table 5.22, row titled "Sales Prices to End Users, Residual Fuel Oil, Greater Than 1% Sulfur Content."

1970 forward: Electric power sector residual fuel oil price estimates (in physical units) from SEDS.

1976-1981: EIA, *Monthly Petroleum Product Price Report*, Table 3.

1975: Federal Energy Administration, *Monthly Petroleum Product Price Report*, Table 3.

Taxes

For 1992 forward, an annual average general sales tax is calculated for each state as a simple average of the 12 monthly values. This method takes into account tax changes during the year. Prior to 1992, the state general sales tax as of September 1 of each year is used.

For 2009, the Federation of Tax Administrators did not publish state general sales tax data, but did publish state general sales tax data for 2010. Therefore, the 2009 tax rates were estimated by comparing the Federation of Tax Administrators' 2008 and 2010 rates for each respective state. If no change occurred between 2008 and 2010, it has been assumed the rate remained constant in 2009. If a rate did change between those years, the State Department of Revenue was consulted to determine the effective date of the rate change to be used in the 2009 estimates accordingly.

1996 forward: Federation of Tax Administrators, http://www.taxadmin.org/current-tax-rates.

1995: The Council of State Governments, *The Book of the States 1994-95* and *1996-97*, Table 6.21.

1994: U.S. Advisory Committee on Intergovernmental Relations, *Significant Features of Fiscal Federalism,* Tables 14 and 26.

1993: Census Bureau, U.S. Department of Commerce, *State Tax Review*, Volume 54, No. 31, map titled "State Gasoline, Sales, and Cigarette Tax Rates as of July 1, 1993," sales tax rates.

1987-1992: Census Bureau, U.S. Department of Commerce, *State Government Tax Collections,* Table 8, column titled "Percentage rate, September 1."

1976-1986: Census Bureau, U.S. Department of Commerce, *Statistical*

Abstract of the United States, table titled "State Government Tax Collections and Excise Taxes," column titled "Excise Taxes, General sales and gross receipts."

Consumption

1970 forward: EIA, State Energy Data System, transportation sector residual fuel oil consumption, including the subcategories for vessel bunkering, military, and railroad uses.

Conversion factor: all years

6.287 million Btu per barrel.

Other Petroleum Products

Sixteen separate products are included in the category called "other petroleum products." Of the 16 products, prices are developed for the 7 noted with asterisks (*) below and described in the following paragraphs. All of these products, except for a small amount of petroleum coke, are used in the industrial sector.

1. Aviation gasoline blending components
2. Crude oil
3. Miscellaneous products (*)
4. Motor gasoline blending components
5. Natural gasoline, including isopentane (1970–1983)
6. Pentanes plus (1984 forward)
7. Petrochemical feedstocks, naphtha (*)
8. Petrochemical feedstocks, other oils (*)
9. Petrochemical feedstocks, still gas (1970–1985) (*)
10. Petroleum coke (*)
11. Plant condensate (1970–1983)
12. Special naphthas (*)
13. Still gas
14. Unfinished oils
15. Unfractionated streams (1970–1983)
16. Waxes (*)

Compilation of petroleum coke prices is described in the petroleum coke section on page 80. For the other six products, only national-level prices are developed because state-level price information is not available, and taxes are not included in any of the estimates. Consumption for the other nine products are completely removed as process fuel or intermediate products. (See Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.)

Starting in 1984, three products—natural gasoline, plant condensate, and unfractionated streams—are dropped, and pentanes plus is added in the U.S. Energy Information Administration (EIA) reporting system that is the basis of the consumption estimates. Natural gasoline (including isopentane) and

plant condensate are reported together as the new product, pentanes plus. Unfractionated streams is dropped because its components are reported separately as liquefied petroleum gases.

Miscellaneous products

Physical unit prices: all years

The products in this category vary from inexpensive (absorption oils similar to kerosene) to very expensive (hydraulic fluids). The price estimates are based on the evidence presented in the Bureau of Mines *Minerals Yearbooks* of the 1970's indicating that the greater part of the miscellaneous product line consists of finished petrochemicals, especially the aromatic hydrocarbons: benzene, toluene, and the xylenes.

Price estimates for 1972, 1977, 1982, 1987, and 1992 are taken from *Census of Manufactures (CM)* data on quantity and value of "aromatics" and "other finished petroleum products" shipped by petroleum refining industries, i.e., Standard Industrial Classification (SIC) 2911. The ratio of miscellaneous-products-to-crude-oil price for these 5 years varies widely. The following ratios, shown rounded, are used to estimate miscellaneous products' prices for the years indicated:

1970–1974:	1.91 times the crude oil price
1975–1979:	2.42 times the crude oil price
1980–1984:	1.56 times the crude oil price
1985–1989:	1.99 times the crude oil price
1990 forward:	1.86 times the crude oil price

Quantity data for 1992 are published in pounds and are converted to barrels by use of the conversion factors of 7.282 pounds per gallon and 42 gallons per barrel.

Data from the subsequent U.S. Census Bureau *Economic Censuses* cannot be used to derive the ratio because only the value of shipments are published. The quantity data are not published because they are reported in various units (pounds, barrels, etc.) and cannot be summed.

Data sources

2008 forward: EIA, Petroleum Marketing Annual, Table 1, column titled "Refiner Acquisition Cost of Crude Oil, Composite" (2008 and 2009), and on EIA website at http://www.eia.gov/dnav/pet/pet_pri_rac2_dcu_nus_a.htm.

1970-2007: EIA, *Annual Energy Review,* http://www.eia.gov/aer/contents.html, Table 5.21, column titled "Composite, Nominal."

1972, 1977, 1982, 1987, 1992: Census Bureau, U.S. Department of Commerce, *Census of Manufactures*, data for Standard Industrial Classification (SIC) 2911 on "Quantity and Value of Shipments by All Producers" as shown in Table 6a from MC77-I-29A, Product Codes 2911054, 2911056 (1972 and 1977); Table 6a-1 from MC87-I-29A, Product Codes 2911D55 and 2911D57 (1982 and 1987); and Table 6a-1 from MC92-I-29A, Product Codes 2911D 55 and 2911D 57 (1992).

Physical unit conversion factors

1992: Gas Processors Suppliers Association in cooperation with the Gas Processors Association, *Engineering Data Book*, 9th Edition, 4th Revision, 1979, pages 16-2 and 16-3, lines 42-47.

Petrochemical feedstocks, naphtha

Physical unit prices: all years

Naphthas for petrochemical feedstock use are those oils with boiling points less than 401°F. Consumer prices for 1978 through 1980 are derived from the special *Annual Survey of Manufactures (ASM)* series on "Hydrocarbon, Coal, and Coke Materials Consumed" by using data for industries in SIC 2869 (industrial organic chemicals) and SIC 2821 (plastics materials, synthetic resins, and nonvulcanizable elastomers). A price estimate for 1982 is obtained from the *CM* and is based on data for SIC 2869 only. Since the ratio of petrochemical-naphtha-to-crude-oil price is reasonably constant in 1978, 1979, 1980, and 1982, the simple average of the four ratios, 1.23, is used to estimate prices for petrochemical feedstocks and naphthas, for all other years.

Data sources

2008 forward: EIA, *Petroleum Marketing Annual*, Table 1, column titled "Refiner Acquisition Cost of Crude Oil, Composite" (2008 and 2009), and on EIA website at http://www.eia.gov/dnav/pet/pet_pri_rac2_dcu_nus_a.htm.

1970-1977, 1981, 1983-2007: EIA, *Annual Energy Review*, http://www.eia.gov/aer/contents.htm, Table 5.21, column titled "Composite, Nominal."

1982: Census Bureau, U.S. Department of Commerce, *1982 Census of Manufactures*, M82-I-28F-3(P), page 6, SIC 2869.

1980: Census Bureau, U.S. Department of Commerce, *1980 Annual Survey of Manufactures*, M80(AS)-4.3, page 9, SIC 2821.

1978, 1979: Census Bureau, U.S. Department of Commerce, *1979 Annual Survey of Manufactures*, M79(AS)-4.3, page 8, SIC 2821 and 2869.

Petrochemical feedstocks, other oils

Physical unit prices: all years

Petrochemical feedstocks referred to as "other oils" or "gas oils" are those oils with boiling points equal to or greater than 401°F. Consumer prices for 3 years are obtained from the data on gas oils presented in the special *ASM* series on hydrocarbons consumed by using data for industries in SIC 2865 (cyclic crudes and intermediates). The other-oils-to-crude-oil price ratio is quite stable, and the average ratio for the 3-year period, 1.607, is used to estimate prices for petrochemical feedstocks, other oils, for all other years.

Data sources

2008 forward: EIA, Petroleum Marketing Annual, Table 1, column titled "Refiner Acquisition Cost of Crude Oil, Composite" (2008 and 2009), and on EIA website at http://www.eia.gov/dnav/pet/pet_pri_rac2_dcu_nus_a.htm.

1970-1977, 1981-2007: EIA, *Annual Energy Review,* http://www.eia.gov/aer/contents.htm, Table 5.21, column titled "Composite, Nominal."

1979, 1980: Census Bureau, U.S. Department of Commerce, *1980 Annual Survey of Manufactures*, M80(AS)-4.3, page 9, SIC 2865.

1978: Census Bureau, U.S. Department of Commerce, *1979 Annual Survey of Manufactures*, M79(AS)-4.3, page 8, SIC 2865.

Petrochemical feedstocks, still gas (1970 through 1985)

Physical unit prices: all years

The source data for still gas is a mixture of consumer prices and producer prices for industries in SIC 2869 and SIC 2911 (petroleum refining). The still-gas-to-crude-oil price ratio is somewhat variable because still gas is a highly variable gaseous mixture. Value and quantity are available for 1972, 1977 through 1980, and 1982. In imputing prices for years when data from the *CM* or *ASM* are not available, the average still-gas-to-crude-oil price ratio, 0.759, is used. After 1985, EIA data series no longer report feedstock and refinery use of still gas separately and all SEDS industrial consumption is removed from the price and expenditure tables. (See Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/sep_prices/notes/pr_consum_adjust.pdf.)

Data sources

1970, 1971, 1981, 1983-1985: EIA, *Annual Energy Review,* Table 5.21, "Composite, Nominal."

1982: Census Bureau, U.S. Department of Commerce, *1987 Census of Manufactures*, MC87-I-29A, Table 6a, SIC 2911.

1979, 1980: Census Bureau, U.S. Department of Commerce, *1980 Annual Survey of Manufactures*, M80(AS)-4.3, page 9, SIC 2869.

1978: Census Bureau, U.S. Department of Commerce, *1979 Annual Survey of Manufactures*, M79(AS)-4.3, page 28, SIC 2869.

1972, 1977: Census Bureau, U.S. Department of Commerce, *1977 Census of Manufactures*, MC77-1-29A, page 29A-20, SIC 2911.

Petroleum coke

Physical unit prices: all years

Petroleum coke is consumed in the commercial, industrial, and electric power sectors. See the **petroleum coke** section on page 80.

Special naphthas

Physical unit prices: all years

Prices for special naphthas are developed as the simple averages of the city prices for "varnish makers and painters naphtha" and two types of "solvent naphtha" that are published in the *Chemical Marketing Reporter*. For 1984 through 1990, the prices are averaged from the first issue of each month; for 1974, 1979, and 1980, when petroleum prices were increasing rapidly, prices are averaged from 10 randomly selected issues; and for all other years, prices are averaged from at least 5 randomly selected issues. For 1991 forward, prices for special naphthas are estimated by applying the year-on-year growth rate of the average U.S. price of motor gasoline to the previous year's special naphtha price.

Data sources

1991 forward: EIA, State Energy Data System, U.S. motor gasoline price estimates.

1970 through 1990: Schnell Publishing Co., Inc., *Chemical Marketing Reporter,*

selected monthly issues.

Waxes

Physical unit prices: all years

Waxes data include fully refined crystalline wax, other refined crystalline wax, and microcrystalline wax. Price estimates for 1970 through 1973 and 1986 forward are calculated using the U.S. Department of Commerce, Census Bureau, data and dividing the value of exports by the quantity exported. For 1974 through 1985, prices are estimated by applying price indices to a representative base price. Producer prices for 1967 for the three waxes are available from data in the 1967 *Census of Manufactures*. A weighted-average price for 1967 of $15.75 per barrel is obtained by summing the values of shipments of the three waxes and dividing the sum by the total quantity shipped. An annual composite price index for these three waxes is listed in the Bureau of Labor Statistics publication *Producer Prices and Producer Price Indexes* for April 1974 through June 1985. Price estimates for 1975 through 1984 are derived by multiplying the published price indices by the estimated 1967 base price. The indices for 1974 and 1985 are estimated as the simple average of monthly price indices that are available for that year. The physical unit conversion factors for wax are 280 pounds per barrel; and 1 pound equals 0.45359237 kilograms.

Data sources

2013 forward: Census Bureau, U.S. Department of Commerce, domestic exports of Paraffin Wax, Containing Less Than 0.75 Percent Oil, commodity code 2712200000 and Microcrystalline Petroleum Wax, commodity code 2712900000, extracted from the U.S. International Trade Commission's Interactive Tariff and Trade DataWeb database, http://dataweb.usitc.gov.

1989-2012: Census Bureau, U.S. Department of Commerce, December issues of Report No. EM-545, titled *Foreign and Domestic Exports* for Paraffin Wax Less Than 0.75% Oil (commodity code 2712200000) and Other Mineral Waxes NESOI (commodity code 2712900000).

1987, 1988: Census Bureau, U.S. Department of Commerce, December issues of Report No. EM-546 (1987) and EM-522 (1988), titled *U.S. Exports, Schedule B, Commodity by Country* for "Paraffin Wax and Other Petroleum Waxes Unblended incl Microcrystalline Wax (commodity code 4925200)."

1986: Census Bureau, U.S. Department of Commerce, December issue of EM-546, *U.S. Exports, Schedule B, Commodity by Country* for "Paraffin Wax, Crystalline, Fully Refined (Commodity 4925210)," "Paraffin Wax, Crystalline, Except Fully Refined (commodity code 4925220)," and "Petroleum Waxes, NSPF incl Microcrystalline Wax (commodity code 4925240)."

1974-1985: Bureau of Labor Statistics, U.S. Department of Labor, *Producer Prices and Producer Price Indexes, Annual Supplement*, commodity code 0577.

1974-1985: Census Bureau, U.S. Department of Commerce, *Census of Manufactures*, 1967, page 29 A-15, quantity and value of shipments of waxes in 1967.

1970-1973: Census Bureau, U.S. Department of Commerce, December issues of FT-410, *U.S. Exports, Schedule B, Commodity by Country* for Paraffin Wax, Crystalline, Fully Refined (commodity code 3326220), Paraffin Wax, Crystalline, Except Fully Refined (commodity code 3326230), and Microcrystalline Wax (commodity code 3326210).

All products

Btu prices: all years

Btu prices for petroleum coke are discussed in the **petroleum coke** section on page 80. Btu prices for the other six petroleum products are calculated by converting physical unit prices from dollars per barrel to dollars per million Btu by using the conversion factors shown in Table TN4.38. The U.S. average price that is developed for each product is assigned to the industrial sector of states in years where there is consumption. The state-level and U.S. "other petroleum" average prices are the average of the seven petroleum products, weighted by SEDS consumption data. The variable state average prices reflect the different mix of products consumed.

Table TN4.39 shows national-level estimated prices and expenditures for the other petroleum product components for selected years from 1970 forward.

Additional Calculations

A few petroleum products are combined for display in the "Other Petroleum" column in tables on price and expenditure estimates for the industrial sector and for total. They include asphalt and road oil, aviation gasoline (total energy only), kerosene, lubricants, and the "other petroleum products" category described in this Section. Expenditures are the sum of the expenditures of the components, and prices are calculated by dividing expenditures by the sum of the adjusted consumption of the components.

Table TN4.38. Other petroleum products Btu conversion factors

Petroleum product	Million Btu per barrel
Miscellaneous products	5.796
Petrochemical feedstocks	
Naphtha	5.248
Other oils	5.825
Still gas	6.000
Special naphthas	5.248
Waxes	5.537

Table TN4.39. Other petroleum price and expenditure estimates for the industrial sector, United States, selected years, 1970 through 2014

Year	Petrochemical Feedstocks			Petroleum Coke	Special Naphthas	Waxes	Miscellaneous Products	Average Price	Total Expenditure
	Naphtha	Other Oils	Still Gas [a]						
	Prices in Nominal Dollars per Million Btu								
1970	0.80	0.94	0.43	0.53	1.96	4.14	1.12	1.07	– –
1975	2.43	2.86	1.31	1.42	3.12	4.95	3.85	2.70	– –
1980	6.68	7.64	4.04	2.19	10.48	12.01	7.57	7.32	– –
1985	6.27	7.38	3.39	1.86	10.87	13.38	9.17	7.16	– –
1990	5.21	6.13	– –	1.73	9.71	14.74	7.13	5.80	– –
1991	4.47	5.26	– –	1.50	9.51	16.33	6.12	5.18	– –
1992	4.32	5.08	– –	1.18	9.55	24.75	5.91	5.01	– –
1993	3.85	4.53	– –	0.97	9.44	19.10	5.27	4.67	– –
1994	3.65	4.30	– –	1.02	9.54	24.75	5.00	4.51	– –
1995	4.04	4.75	– –	1.15	9.81	23.89	5.53	4.87	– –
1996	4.85	5.71	– –	1.51	10.48	22.95	6.65	5.65	– –
1997	4.46	5.25	– –	1.37	10.44	24.62	6.11	5.30	– –
1998	2.93	3.45	– –	1.27	9.00	20.11	4.02	3.63	– –
1999	4.10	4.83	– –	1.31	9.91	20.54	5.62	4.66	– –
2000	6.62	7.80	– –	1.39	12.66	21.33	9.07	7.10	– –
2001	5.38	6.33	– –	1.55	12.07	19.26	7.36	5.76	– –
2002	5.65	6.65	– –	1.28	11.38	16.53	7.73	5.92	– –
2003	6.69	7.87	– –	1.29	13.15	15.76	9.16	6.91	– –
2004	8.67	10.20	– –	1.46	15.66	17.35	11.87	8.44	– –
2005	11.78	13.86	– –	1.82	19.12	18.25	16.12	11.43	– –
2006	14.12	16.62	– –	2.06	21.70	23.88	19.33	13.63	– –
2007	15.92	18.74	– –	2.44	23.73	26.71	21.80	15.35	– –
2008	22.20	26.14	– –	4.11	27.67	33.64	30.40	21.02	– –
2009	13.90	16.36	– –	2.40	20.16	24.35	19.03	13.14	– –
2010	17.97	21.16	– –	3.40	24.05	32.76	24.61	18.27	– –
2011	23.88	28.10	– –	4.55	30.41	34.70	32.69	24.54	– –
2012	23.66	27.84	– –	3.43	31.32	34.76	32.39	22.96	– –
2013	23.55	27.72	– –	2.72	30.46	33.37	32.25	24.04	– –
2014	21.57	25.39	– –	2.60	29.26	33.91	29.53	22.65	– –
	Expenditures in Millions of Nominal Dollars								
1970	239	171	32	70	323	106	96	– –	1,038
1975	683	793	124	213	450	166	729	– –	3,159
1980	3,173	6,564	371	215	2,022	395	1,799	– –	14,539
1985	1,478	3,729	256	241	1,733	420	1,308	– –	9,166
1990	1,811	4,622	– –	400	1,040	491	983	– –	9,347
1991	1,335	4,350	– –	311	837	574	933	– –	8,341
1992	1,629	4,141	– –	341	998	922	592	– –	8,624
1993	1,348	3,821	– –	189	987	764	499	– –	7,609
1994	1,455	3,607	– –	221	773	1,004	530	– –	7,591
1995	1,506	3,808	– –	245	695	970	537	– –	7,760
1996	2,327	4,169	– –	347	781	1,117	592	– –	9,333
1997	2,394	4,524	– –	279	755	1,077	597	– –	9,625
1998	1,714	2,828	– –	413	965	852	478	– –	7,249
1999	2,060	3,918	– –	521	1,441	769	629	– –	9,338
2000	4,064	5,630	– –	357	1,232	706	1,081	– –	13,070
2001	2,656	4,194	– –	502	947	700	920	– –	9,919
2002	3,291	4,202	– –	396	1,165	532	1,038	– –	10,624
2003	4,099	5,505	– –	367	1,058	489	1,153	– –	12,671
2004	6,495	7,952	– –	537	799	534	1,346	– –	17,663
2005	8,227	9,813	– –	602	1,195	572	1,818	– –	22,228
2006	8,879	13,140	– –	762	1,520	624	2,630	– –	27,555
2007	8,956	13,947	– –	870	1,851	585	2,910	– –	29,119
2008	10,596	16,930	– –	1,462	2,349	644	4,318	– –	36,299
2009	6,557	6,948	– –	687	931	298	2,889	– –	18,309
2010	8,818	9,574	– –	587	628	560	3,906	– –	24,072
2011	11,635	10,919	– –	613	688	523	5,385	– –	29,763
2012	10,738	7,998	– –	623	461	532	5,233	– –	25,585
2013	12,196	6,208	– –	353	3,046	550	5,519	– –	27,873
2014	9,546	6,276	– –	302	3,106		5,396	– –	25,127

[a] Consumption data for this series are not available after 1985.
– – = Not applicable.
Where shown, R = Revised data and (s) = Value less than 0.5 million nominal dollars.

Note: Expenditure totals may not equal sum of components due to independent rounding.
Source: State Energy Data System.

Section 5. Renewable Energy Sources

Prices and expenditures for renewable energy sources are based on consumption estimates from the State Energy Data System (SEDS). Renewable energy sources reported in SEDS include estimates of wood and waste in all sectors, hydroelectric power in the industrial and commercial sectors, and the electric power sector's use of hydropower and geothermal, wind, wood, waste, photovoltaic, and solar thermal energy. SEDS also includes, for 1989 forward, the residential and commercial sectors' use of geothermal and solar energy and the industrial sector's use of geothermal energy.

Fuel Ethanol

Beginning in 1993, fuel ethanol blended into motor gasoline is included in SEDS motor gasoline consumption volumes. For these years, the price and expenditure estimates for finished motor gasoline include the fuel ethanol blended into motor gasoline. Prior to 1993, fuel ethanol estimates are added separately from motor gasoline for calculating total energy expenditures in SEDS. Fuel ethanol expenditures are estimated by assigning motor gasoline prices to the fuel ethanol quantities blended into motor gasoline.

Hydroelectric, Geothermal, Wind, Photovoltaic, and Solar Thermal Energy

In SEDS, it is assumed that there are no direct fuel costs for hydroelectric, geothermal, wind, photovoltaic, or solar thermal energy. SEDS consumption values are adjusted by removing these energy sources before calculating energy expenditures, as described in Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.

Wood and Waste

Prices are estimated for wood and waste in SEDS. Wood includes wood and wood-derived fuels. Waste is biomass waste which includes municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural byproducts, etc. Prior to 2001, waste also includes non-biomass waste (municipal sold waste from non-biogenic sources, and tire-derived fuel). It is assumed that taxes are included in the prices reported on the U.S. Energy Information Administration (EIA) "Residential Energy Consumption Survey," the "Manufacturing Energy Consumption Survey," and the various electric power survey forms that are used as the basis for the SEDS price estimates.

Residential sector

Physical unit prices, all years

Prices paid for wood by the residential sector for 1970 forward are based on unpublished data from the Form EIA-457, "Residential Energy Consumption Survey, Fall-Winter 1980-1981" (RECS 1980), and the "1993 Residential Energy Consumption Survey" (RECS 1993). The nine Census division average prices for residential wood from RECS 1980 are used to estimate prices for 1970 through 1989. The 1980 Census division residential wood prices are adjusted in proportion to the changes in U.S. average residential distillate fuel oil prices each year compared to the 1980 distillate fuel oil price. The Census division estimated prices are assigned to the states within each Census division for 1970 through 1989. The four Census region average prices for residential wood from RECS 1993 are used to estimate prices for 1990 forward. The 1993 Census division wood prices are adjusted in proportion to the changes in U.S. average residential distillate fuel oil prices each year compared to the 1990 distillate fuel oil price. The estimated Census region wood prices are assigned to the states within each Census region for 1990 forward.

Btu prices, all years

Prices in dollars per cord are converted to dollars per million Btu using the conversion factor of 20 million Btu per cord.

Data sources

Prices

1990 forward: EIA, unpublished data from Form EIA-457, "1993 Residential Energy Consumption Survey," http://www.eia.gov/consumption/residential/index.cfm, Census region compilation of the answers to questions J-28 and J-33 through J-36.

1970-1989: EIA, unpublished data from Form EIA-457, "Residential Energy Consumption Survey, Fall-Winter 1980-1981" Census division compilation of data on average prices paid for wood.

1970 forward: EIA, U.S. average residential distillate fuel oil prices (DFRCD) from SEDS.

Consumption

1970 forward: EIA, State Energy Data System, residential wood consumption adjusted as described in Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.

Conversion factor

20 million Btu per cord.

Commercial sector

Btu prices, 1989 forward

Wood consumption in the commercial sector is estimated for two groups: (1) commercial combined-heat-and-power (CHP) and electricity-only facilities, and (2) other commercial entities. State-level wood prices are not available for either of these two groups. The SEDS electric power sector annual average U.S. price for wood is calculated and assigned to the CHP and electricity-only facilities' consumption each year. The state-level residential wood prices are assigned to the other commercial entities.

Waste is consumed in the commercial sector by commercial CHP and electricity-only facilities only. States with commercial waste consumption are assigned the electric power sector annual average U.S. price for waste.

The state-level commercial sector wood and waste prices are consumption-weighted averages of the consumption and prices of the individual components. The consumption data are adjusted to account for quantities obtained at no cost. (See the discussion in Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.

Btu prices, 1970 through 1988

Wood and waste consumption and prices are not available for commercial CHP and electricity-only facilities prior to 1989. States with commercial wood consumption are assigned the state-level residential wood price.

Data sources

Prices

1989 forward: EIA, U.S. average consumption-weighted electric power wood and waste prices (WDEID and WSEID) from SEDS.

1970 forward: EIA, state-level residential wood prices (WDRCD) from SEDS.

Consumption

1970 forward: EIA, State Energy Data System, commercial wood and waste consumption adjusted as described in Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.

Industrial sector

The industrial sector price estimates for wood and waste combined in SEDS are developed by dividing industrial sector consumers into two groups: (1) industrial combined heat and power (CHP) and electricity-only facilities and (2) other industrial entities. Wood and waste consumption and prices for industrial CHP and electricity-only facilities are not available prior to 1989. For 1989 forward, the SEDS electric power sector annual average state prices for wood and for waste are assigned to the industrial CHP and electricity-only facilities' consumption each year.

For the other industries, wood and waste consumed by the manufacturing sector is estimated separately by the types of wood and waste within the NAICS categories based on data from the EIA "Manufacturing Energy Consumption Survey" and the U.S. Census Bureau, economic surveys by industry. The state-level industrial sector wood and waste prices are consumption-weighted averages of the prices of the individual wood and waste components of each of the NAICS categories.

For 2011 forward, industrial landfill gas is assigned the average U.S. prices for waste used in the electric power sector. The state-level industrial wood and waste prices are consumption-weighted averages of the prices of landfill gas and wood and waste used by the manufacturing industries.

The consumption data used to calculate expenditures in SEDS are adjusted to account for estimated quantities of wood and waste obtained at no cost. (See the discussion in Section 7, "Consumption Adjustments for Calculating Expenditures, at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.)

Btu prices, 1998 forward

Manufacturing industries

For 1998 forward, wood and waste prices for the manufacturing industries are consumption-weighted averages based on unpublished data from the Form EIA-846, "Manufacturing Energy Consumption Survey" (MECS). Data from the 1998 MECS are used for 1998 through 2001, data from the 2002 MECS are used for 2002-2005, data from the 2006 MECS are used for 2006-2010, and data from the 2010 MECS are used from 2011 forward. MECS collects data on quantities consumed and quantities purchased in million Btu and expenditures in dollars for five types of wood and waste: pulping liquor, agricultural waste, wood harvested from trees, wood refuse and byproducts from mills, and wood and paper refuse. The quantities purchased and expenditures are used to calculate average prices for each type of wood and waste. MECS also identifies consumption of the different types of wood and waste by North American Industry Classification System (NAICS). For each of the NAICS industries (311, 321, 322, 337, and other), an average wood and waste price is calculated by using the consumption of each of the five types of wood and waste to weight the average of their respective NAICS categories prices. These average prices by NAICS code are applied to the SEDS estimates of wood and waste consumption by NAICS code in each state to calculate state-level weighted average prices for 1998 forward.

Landfill gas

For 2011 forward, prices for landfill gas consumption other than for direct use are assigned the average U.S. prices of waste consumed by the electric power sector.

Industrial combined-heat-and-power and electricity-only facilities

The SEDS electric power sector annual average state prices for wood and for waste are assigned to the industrial CHP and electricity-only facilities' consumption each year.

Btu prices, 1994 through 1997

Manufacturing industries

For 1994 through 1997, industrial sector wood and waste prices are consumption-weighted averages based on unpublished data from the Form EIA-846, "1994 Manufacturing Energy Consumption Survey" (MECS 1994). MECS 1994 collects data on quantities consumed and quantities purchased in million Btu and expenditures in dollars for five types of wood and waste: pulping liquor, agricultural waste, wood harvested from trees, wood refuse and byproducts from mills, and wood and paper refuse. The quantities purchased and expenditures are used to calculate average prices for each type of wood and waste. MECS 1994 also identifies consumption of the different types of wood and waste by Standard Industrial Classification (SIC) categories 20, 24, 25, 26, and other (a subtotal of SIC codes 21 through 23 and 27 through 30). For each of the SIC codes, an average wood and waste price is calculated by using the consumption of each of the five types of wood and waste to weight the average of their respective prices. These average prices by SIC code for 1994 are applied to the SEDS estimates of wood and waste consumption by SIC code in each state to calculate state-level weighted average prices for 1994 and 1995.

For 1996 and 1997, SEDS consumption and price estimates are developed using the 1997 *Economic Census*, which uses the North American Industry Classification System (NAICS). Data for the NAICS industries (311, 321, 322, 337, and other) are used.

Industrial combined-heat-and-power and electricity-only facilities

The SEDS electric power sector annual average state prices for wood and for waste are assigned to the industrial CHP and electricity-only facilities' consumption each year.

Btu prices, 1990 through 1993

Manufacturing industries

For 1990 through 1993, industrial sector wood and waste prices are consumption-weighted averages based on unpublished data from the Form EIA-846, "1991 Manufacturing Energy Consumption Survey" (MECS 1991). MECS 1991 collects data on quantities consumed and quantities purchased in million Btu and expenditures in dollars for five types of wood and waste: waste materials, pulping liquor, round wood, wood chips, and biomass. The quantities purchased and expenditures are used to calculate average prices for each type of wood and waste. MECS 1991 also identifies consumption of the different types of wood and waste by Standard Industrial Classification (SIC) categories 20, 24, 26, and other (a subtotal of SIC industries 21 through 25 and 27 through 30). For each of the SIC categories, an average wood and waste price is calculated by using the consumption of each of the five types of wood and waste to weight the average of their respective prices. These average prices by SIC code for 1991 are applied to the SEDS estimates of wood and waste consumption by SIC code in each state to calculate state-level weighted average prices for 1990 through 1993.

Industrial combined-heat-and-power and electricity-only facilities

The SEDS electric power sector annual average state prices for wood and for waste are assigned to the industrial CHP and electricity-only facilities' consumption each year.

Btu prices, 1986 through 1989

Manufacturing industries

For 1986 through 1989, industrial sector wood and waste prices are consumption-weighted averages based on data from the Form EIA-846, "1988 Manufacturing Energy Consumption Survey" (MECS 1988). MECS 1988 collects data on inputs of energy for heat, power, and electricity generation and quantities purchased in billion Btu and expenditures in dollars for five types of wood and waste: waste materials, pulping liquor, round wood, wood chips, and biomass. The quantities consumed and expenditures are used to calculate average prices for each type of wood and waste. MECS 1988 also identifies consumption of the different types of wood and waste by Standard Industrial Classification (SIC) categories 20, 24, 26, and other (mainly SIC 25). For each of the SIC codes, an average wood and waste price is calculated by using the consumption of each of the five types of wood and waste to weight the average of the respective prices. These average prices by SIC code for 1988 are applied to the SEDS estimates of wood and waste consumption by SIC code in each state to calculate state-level weighted average prices for 1986 through 1989.

Industrial combined-heat-and-power and electricity-only facilities

Information on industrial combined-heat-and-power (CHP) and electricity-only facilities' use of wood and waste became available beginning in 1989. Although quantities of wood and waste used by industrial CHP and electricity-only facilities are available for 1989, prices are not available. The SEDS electric power sector annual average prices for wood and for waste are assigned to the industrial CHP and electricity-only facilities' consumption in 1989.

Btu prices, 1980 through 1985

For 1980 through 1985, industrial sector wood and waste prices are consumption-weighted averages based on data published in the *Manufacturing Energy Consumption Survey: Consumption of Energy, 1985* (MECS 1985), Table 2. MECS 1985 contains data on inputs of energy for heat, power, and electricity generation in trillion Btu for two types of wood and waste: major byproducts and other. MECS 1985 also identifies consumption of the two types of wood and waste by the SIC categories 20, 24, 26, and other (mainly SIC 25). Since no price data were collected on MECS 1985, the average prices for each of the SIC categories developed from MECS 1988 are applied to the MECS 1985 estimates of wood and waste consumption by SIC code in each state to calculate state-level weighted average prices for 1980 through 1985.

Btu prices, 1970 through 1979

There are no data available for estimating industrial prices for wood and waste in 1970 through 1979. Therefore, the 1980 state-level average industrial sector wood and waste prices are used for all states in 1970 through 1979.

Data sources

Prices

2011 forward: EIA, SEDS wood and waste consumption by NAICS categories 311221, 311314, 321113, 321912, 322121, 322130, and 337122, developed from the U.S. Department of Commerce, Census Bureau, 2012 *Economic Census*, Industry Series, http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml, data on value of shipments. The number of employees from the 2012 *Economic Census* is also used.

2011 forward: EIA unpublished data from Form EIA-846, "2010 Manufacturing Energy Consumption Survey," national data on quantities purchased, quantities consumed as fuel, and expenditures for pulping liquor, agricultural waste, wood harvested from trees, wood refuse and byproducts from mills, and wood and paper refuse, by North American Industry Classifications (NAICS) categories.

2011 forward: EIA, SEDS landfill gas consumption other than for direct use, developed from the U.S. Environmental Protection Agency, Landfill Methane Outreach Program database, http://www.epa.gov/lmop/.

1989 forward: EIA, U.S. average consumption-weighted electric power wood and waste prices (WDEID and WSEID) from SEDS.

2006 through 2010: EIA, SEDS wood and waste consumption by NAICS categories 311221, 311311, 321113, 321912, 322121, 322130, and 337122, developed from the U.S. Department of Commerce, Census Bureau, 2007 *Economic Census*, Industry Series, http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml, data on value of shipments. The number of employees from the *2007 Economic Census* is also used.

2006 through 2010: EIA unpublished data from Form EIA-846, "2006 Manufacturing Energy Consumption Survey," national data on quantities purchased, quantities consumed as fuel, and expenditures for pulping liquor, agricultural waste, wood harvested from trees, wood refuse and byproducts from mills, and wood and paper refuse, by North American Industry Classifications (NAICS) categories.

2002 through 2005: EIA unpublished data from Form EIA-846, "2002 Manufacturing Energy Consumption Survey," national data on quantities purchased, quantities consumed as fuel, and expenditures for pulping liquor, agricultural waste, wood harvested from trees, wood refuse and byproducts

from mills, and wood and paper refuse, by North American Industry Classifications (NAICS) categories.

2001 through 2005: EIA, SEDS wood and waste consumption by NAICS categories 311221, 311311, 321113, 321912, 322121, 322130, and 337122, developed from the U.S. Department of Commerce, Census Bureau, *2002 Economic Census*, Industry Series, http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml, Table 2, data on value added in manufacture. The number of employees from the *2002 Economic Census* is also used.

1998 through 2001: EIA, unpublished data from Form EIA-846, "1998 Manufacturing Energy Consumption Survey," national data on quantities purchased, quantities consumed as fuel, and expenditures for pulping liquor, agricultural waste, wood harvested from trees, wood refuse and byproducts from mills, and wood and paper refuse, by North American Industry Classifications (NAICS) categories.

1996 through 2000: EIA, SEDS wood and waste consumption by NAICS categories 311221, 311311, 321113, 321912, 322121, 322130, and 337122, developed from the U.S. Department of Commerce, Census Bureau, *1997 Economic Census, Industry Series*, http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml, Table 2, data on value added in manufacture. The number of employees from the *1997 Economic Census* is also used.

1994 through 1997: EIA, unpublished data from Form EIA-846, "1994 Manufacturing Energy Consumption Survey," national data on quantities purchased, quantities consumed as fuel, and expenditures for pulping liquor, agricultural waste, wood harvested from trees, wood refuse and byproducts from mills, and wood and paper refuse, by Standard Industrial Classifications (SIC) categories.

1990 through 1995: EIA, SEDS wood and waste consumption by SIC categories 20, 24, 25, 26, and other (SIC 21-23 and 27-30) developed from the U.S. Department of Commerce, Census Bureau, *1992 Census of Manufactures, Industry Series*, Table 2, data on value added in manufacture and number of employees.

1990 through 1993: EIA, unpublished data from Form EIA-846, "1991 Manufacturing Energy Consumption Survey," national data on quantitiespurchased, quantities consumed as fuel, and expenditures for waste materials, pulping liquor, round wood, wood chips, and biomass.

1986 through 1989: EIA, unpublished data from Form EIA-846, "1988 Manufacturing Energy Consumption Survey," national data on inputs of energy for heat, power, and electricity generation, quantities purchased, and expenditures for waste materials, pulping liquor, round wood, wood chips, and biomass by SIC categories.

1986 through 1989: EIA, SEDS wood and waste consumption by Standard Industrial Classification for 1987 developed from the U.S. Department of Commerce, Census Bureau, *1992 Census of Manufactures, Industry Series,* Table 2, revised 1987 data on value added in manufacturing and number of employees.

1980 through 1985: EIA, DOE/EIA-0512(85) *Manufacturing Energy Consumption Survey: Consumption of Energy, 1985*, Table 2. National data on inputs of energy for heat, power, and electricity generation for "Major Byproducts" and "Other" by SIC categories.

1980 through 1985: EIA, SEDS wood and waste consumption by Standard Industrial Classification for 1982 developed from the U.S. Department of Commerce, Census Bureau, *1982 Census of Manufactures, Industry Series,* Table 2, data on value added in manufacturing and number of employees.

1970 through 1979: EIA, SEDS 1980 state-level prices for industrial wood and waste.

Consumption

1970 forward: EIA, State Energy Data System, industrial wood and waste consumption adjusted as described in Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.

Electric power sector

State-level data on the electric power sector wood and waste consumption are taken from SEDS and are collected on Form EIA-923, "Power Plant Operations Report," and predecessor forms. All electric generation facilities (utilities and independent power producers) are required to report consumption on Form EIA-923, but no price data are collected. State and national wood and waste prices in dollars per million Btu are developed for electric utilities from data reported on Federal Energy Regulatory Commission (FERC) Form 1 and from informal correspondence. Taxes are included in the prices for all years. Prices are not available for independent power producers.

Btu prices: all years

1989 forward. State-level prices for wood and waste used by electric power plants, in dollars per million Btu, are calculated from data obtained from FERC Form 1, FERC Form 423 (through 2007), and Form EIA-412 (through 2000) and by follow-up correspondence to electric companies that are not required to submit those forms. For states with more than one utility using

wood and waste, a consumption-weighted average price is calculated. There are anomalies that are unique to waste used for electric power generation. In some cases of municipal and industrial waste, there is no charge, and in other cases the electric power facilities charge a "tipping fee" for accepting the waste. That is, instead of paying for the fuel, the power plants are paid to take the fuel. For states where all electric power facilities pay nothing for the fuel or charge a fee for receiving it, a price of zero is assigned. Although the corresponding consumption is included in calculating the average price for all fuels consumed by electric utilities in the United States, the expenditure included is zero.

While information on independent power producers' use of wood and waste is available from 1989 forward, data on prices are not available. The average prices for wood and waste consumed by electric utilities are used for the electric power sector, which includes both electric utilities and independent power producers.

1983 through 1988. A U.S. average price in dollars per million Btu is calculated and assigned to all states. The national price is a consumption-weighted average price based on data obtained from FERC Form 1 and Form EIA-412 and by follow-up telephone correspondence with the electric utilities that report use of wood and waste for generating electricity.

Prices are erratic for wood and waste used at electric utilities. In addition to the anomalies of no charge for the fuel and the "tipping fee" mentioned above, handling refuse-derived fuel is more labor intensive than handling conventional fossil fuels. The labor expenses are included in the plant's operating costs, not the fuel costs. Wood and waste prices are also erratic because the demand is relatively small and the pricing mechanism, even for a single facility, may change from year to year. A price or quantity change by a single major user affects the national price more significantly than for any other fuel.

1978 through 1982. National average prices are derived from data collected on Federal Power Commission (FPC) Form 423 and published monthly by EIA in *Cost and Quality of Fuels for Electric Utility Plants (C&Q)*. For these years, fossil-fueled plants with a combined capacity of 25 mega-watts or greater were required to report on FPC Form 423. Annual prices of wood and waste sold to electric utilities are developed as quantity-weighted monthly prices for those plants where wood chips and refuse were used as fuel. Beginning in 1983, the reporting threshold was raised to 50 megawatts, and very few plants reported use of wood and waste on the FPC Form 423 in 1983 and subsequent years.

A detailed review of data in *C&Q* showed that some entries were in error by factors of 10, 100, or 1,000. Accordingly, the following corrections were made. For 1982, the February, March, and April quantities for the Florida Power Corporation are divided by 1,000 to make them 80, 40, and 60 short tons, respectively. The March, April, and May costs for Northern States Power are multiplied by 100 to make them $0.70 per million Btu. For the five months from November 1979 through March 1980, the reported quantities of wood delivered to Burlington Electric Co. are divided by 10 in order to place them in the range of 7,980 to 9,390 short tons. For the eight months from June 1978 through January 1979, seed corn delivered to the Logansport Indiana Electric Department are included in the waste. For February 1978, the reported quantity of wood delivered to the United Power Associates is divided by 1,000 to make it 90 short tons.

1970 through 1977. The annual prices for wood chips and refuse are derived by deflating the 1978 price by using the gross domestic product implicit price deflator based on 1987 dollars. The deflators are shown in Table TN5.1.

Data sources

Prices

2008 forward: FERC Form 1, "Electric Utility Annual Report," http://www.ferc.gov/docs-filing/forms/form-1/data.asp, and follow-up correspondence with the electric utilities that report use of wood and waste for generating electricity.

2001 through 2007: FERC Form 1, "Electric Utility Annual Report," http://www.ferc.gov/docs-filing/forms/form-1/data.asp, FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants" and EIA Form EIA-423, "Monthly Cost and Quality of fuels for Electric Plants Report," http://www.eia.gov/electricity/data/eia423/, and follow-up telephone calls to the electric utilities that report use of wood and waste for generating electricity.

1983 through 2000: Data reported on FERC Form 1, "Electric Utility Annual Report," http://www.ferc.gov/docs-filing/forms/form-1/data.asp, Form EIA-412, "Annual Report of Public Electric Utilities," FERC Form 423, "Monthly Report of Cost and Quality of Fuels for Electric Plants," http://www.eia.gov/electricity/data/eia423/, and follow-up telephone calls to the electric utilities that report use of wood and waste for generating electricity.

1978-1982: EIA, *Cost and Quality of Fuels for Electric Utility Plants*, table titled "Wood Chips, Refuse, and Petroleum Coke Used as Fuel by Steam-Electric Plants."

1970-1978: EIA, *Annual Energy Review 1991*, Appendix C, Gross Domestic Product and Implicit Price Deflator.

Table TN5.1. Price deflators used for wood and waste prices, 1970 through 1977

Years	Deflator	Years	Deflator
1970	35.1	1974	44.9
1971	37.1	1975	49.2
1972	38.8	1976	52.3
1973	41.3	1977	55.9

Consumption

1970 forward: EIA State Energy Data System, wood and waste consumed by the electric power sector.

Electricity Consumed by End-Use Sectors

Electricity prices in the U.S. Energy Information Administration (EIA) State Energy Data System (SEDS) tables are retail prices for sales to ultimate users in dollars per million Btu. Prices are developed for the residential, commercial, industrial, and transportation sectors. Taxes collected by a electricity retailer from an end user and turned over to a government authority are included in the revenues reported in the source data for the electricity prices—the EIA *Electric Sales and Revenue* and *Electric Power Annual*, or the Edison Electric Institute *Statistical Yearbook*—and, therefore, are included in the prices calculated from revenue.

Consumption is based on sales by the electric power sector to ultimate users. Electricity consumption data by state for the residential, commercial, industrial, and transportation sectors are obtained from SEDS. Consumption of electricity in the industrial sector is adjusted for estimated refinery use in each state. (See the discussion in Section 7, "Consumption Adjustments for Calculating Expenditures," at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.)

Physical unit prices: 2003 forward

Physical unit prices for electricity are calculated for the residential, commercial, industrial, and transportation sectors as the average revenue per kilowatthour of sales by all electric power retailers to a state, based on the EIA *Electric Sales and Revenue* database. In 2003, for Missouri and Tennessee, there are transportation electricity consumption values in SEDS based on U.S. Department of Transportation data, but no comparable transportation sales and revenue in the *Electric Sales and Revenue*. Prices for each of these states are calculated by applying the percentage change in the commercial sector prices between the previous year and the current year to the previous year's transportation sector price.

Physical unit prices: 1990 through 2002

For 1990 through 2002, physical unit prices for states are calculated for all four sectors as the average revenue per kilowatthour of sales by all electric power retailers reporting sales to a state. Revenue and sales data from the Form EIA-861 "Annual Electric Power Industry Report" database, as published in the EIA *Electric Sales and Revenue,* are used to calculate physical unit prices. The prices for the residential and industrial sectors are based directly on the database. Commercial sector prices are calculated as the commercial sector revenues plus the non-transportation portion of "Other" revenues divided by the commercial sales plus the non-transportation portion of "Other" sales. The non-transportation portions of "Other" sales and revenues are estimated using SEDS transportation electricity consumption and the *Electric Sales and Revenue* "Other" sales. The transportation sector prices are based on sales and revenues reported by a non-highway-street-lighting subsector of the "Other" category from the EIA-861 database for 1990 through 2000. Transportation electricity prices for 2001 and 2002 are calculated by applying the percentage change in the commercial sector prices between the previous year and the current year to the previous year's transportation sector price.

Transportation electricity prices for Massachusetts and New Jersey in 2000 are out of range and are replaced with prices calculated by applying the percentage change in the commercial sector 1999 and 2000 prices to the 1999 transportation sector price.

Physical unit prices: 1987 through 1989

For 1987 through 1989, state physical unit prices are calculated for all four sectors as the average revenue per kilowatthour of sales by all electric power retailers reporting sales to a state. Revenue and sales data are from the EIA *Electric Power Annual* data files.

The prices for the residential and industrial sectors are based on residential revenues and sales, and industrial revenues and sales, respectively. Commercial sector prices are calculated as the commercial sector revenues plus the non-transportation portion of "Other" revenues divided by the commercial sales plus the non-transportation portion of "Other" sales. The non-transportation portions of "Other" sales and revenues are estimated using SEDS transportation electricity consumption and the *Electric Sales and Revenue* "Other" sales. The transportation sector prices are calculated by dividing the "Other" category revenues by "Other" sales.

Physical unit prices: 1970 through 1986

For 1970 through 1986, preliminary physical unit prices for states are calculated for all four sectors as the average revenue per unit of sales by all

electric power facilities reporting sales to a state. The calculation of physical prices is based upon the revenues and sales data from the *Statistical Yearbook* for each year in the series. Data for the residential sector and industrial sector are drawn from their respective columns. The commercial sector is the sum of the columns titled "Commercial," "Street and Highway Lighting," "Other Public Authorities," and "Interdepartmental." The transportation sector is the column titled "Railroads and Railways."

For 1980 through 1986, prices are based on preliminary revenues and sales data in the given year and are replaced with revised data in the following year. The only exception to this rule is the revenues data for AR in 1981; preliminary data are used in this case because of an apparent error in the revised data.

For 1970 through 1981, MD prices are assigned to DC. There are no other missing prices for the residential, commercial, and industrial sectors.

In the transportation sector, numerous price assignments are made due to the lack of sector-specific price data. Generally, electricity usage in the transportation sector is small; the sector's electricity use ranged from 0.1% to 0.2% of total U.S. electricity consumption in 1970 through 1986. From 1970 through 1986, only 15 states used measurable amounts of electricity in the transportation sector (CA, DC, FL, GA, IL, LA, MA, MD, NJ, NY, OH, PA, TN, VA, and WA). A few individual state prices are unavailable and are assigned the commercial sector prices: LA for 1970 through 1986 and TN for 1970 through 1986. (Prices are available for LA in 1970, 1972, 1973, but those prices are replaced by commercial sector prices to maintain a consistent series for the state.) In addition, MA transportation prices for 1985 and 1986 are estimated by multiplying the MA 1985 and 1986 commercial prices by the average of the ratios of the commercial-to-transportation sector prices for 1980 through 1984. Similarly, the VA 1977 transportation price is estimated by multiplying the VA commercial price in 1977 by the average of the ratios of the commercial-to-transportation sectors prices for 1978 through 1982.

In order to reconcile national-level electricity prices based on the *Statistical Yearbook* with the EIA national-level electricity prices published in the *Annual Energy Review (AER),* yearly adjustment factors are calculated for the residential, commercial, and industrial sectors as follows: a preliminary U.S. price for each sector is calculated as the average of the state prices, weighted by SEDS consumption. These preliminary U.S. prices are divided by the national-level electricity prices published in the *AER*, and the quotient is used as an adjustment factor. The preliminary state prices are multiplied by the adjustment factor to produce the final physical unit state prices in those sectors. Since no transportation sector prices are published in the *AER*, no adjustments are made to that sector and the final physical unit prices are derived solely from the *Statistical Yearbook* sales and revenue data. The annual adjustment factors for the residential, commercial, and industrial sectors are shown in Table TN6.1.

Btu prices: all years

Btu prices for states are calculated by dividing the physical unit prices by the conversion factor 3,412 Btu per kilowatthour. U.S. Btu prices are calculated as the average of the state Btu prices, weighted by consumption data from SEDS, adjusted for process fuel consumption in the industrial sector.

Data sources

Prices

1990 forward: Electricity retail sales and revenue data from EIA, as shown in the historical spreadsheets of the *Electric Power Annual,* "Retail Sales of Electricity by State by Sector by Provider (EIA-861)" and "Revenue from Retail Sales of Electricity by State by Sector by Provider (EIA-861)" at http://www.eia.gov/electricity/data/state/, sector category "Total Electric Industry."

Transportation sector variations:

- 2003 forward: Column labeled "Transportation".
- 2001 and 2002: Prices calculated by EIA.
- 1990-2000: Data for non-highway lighting portion of "Other" from the Form EIA-861 database files.
- 1987-1989: EIA, *Electric Power Annual 1988*, Tables 19 and 21 (1987 data); *Electric Power Annual*, Tables 27 and 29 (1988 and 1989).

1970-1986: Edison Electric Institute (EEI), *Statistical Yearbook of the Electric Utility Industry,* tables titled "Revenues: Total Electric Utility Industry" and "Energy Sales: Total Electric Utility Industry," based on EEI surveys.

1970-1986: EIA, *Annual Energy Review 1989*, Table 95, "Retail Prices of Electricity Sold by Electric Utilities, 1960-1989."

Consumption

1970 forward: EIA, State Energy Data System, electricity consumption by end-use sector.

Conversion factor: all years

3,412 Btu per kilowatthour.

Table TN6.1. Annual electricity price adjustment factors, 1970 through 1986

Year	Residential	Commercial	Industrial
1970	1.05121	1.05712	1.06832
1971	1.05632	1.05926	1.05504
1972	1.05271	1.05514	1.05765
1973	1.06626	1.06188	1.05991
1974	1.09572	1.08098	1.08732
1975	1.09257	1.08098	1.08732
1976	1.07753	1.07755	1.06891
1977	1.06746	1.07675	1.06820
1978	1.06654	1.08273	1.06861
1979	1.06986	1.08349	1.06441
1980	1.04457	1.06109	1.06781
1981	1.05821	1.06943	1.06523
1982	1.06654	1.06351	1.05597
1983	1.05421	1.05301	1.05537
1984	0.99693	1.01924	0.99015
1985	1.00010	1.02008	0.98355
1986	0.99854	1.01518	0.98618

Source: EIA calculations based on data from the *Annual Energy Review* and the *Statistical Yearbook of the Electric Utility Industry*.

Nuclear Fuel for Generation of Electricity

Nuclear fuel prices are developed by EIA for the electric power sector. State-level data on the amount of electricity generated from nuclear power are taken from the State Energy Data System (SEDS). Nuclear power plants operated by regulated electric utilities report fuel costs to the Federal Energy Regulatory Commission (FERC) annually. These data include all taxes, transportation, and handling costs. Plants operated by independent power producers do not need to report fuel costs to FERC. Their costs are estimated by EIA or third-party sources.

State-level nuclear fuel prices are estimated by EIA in three steps: (1) the total cost of fuels consumed at the plant level is compiled by multiplying the reported or estimated fuel cost with net electricity generation; (2) the sum of total fuel costs for all the plants in a state is divided by the sum of their net electricity generation; and (3) the cost per kilowatthour created in Step 2 is divided by an annual U.S. average thermal conversion factor to create the price in dollars per million Btu. Occasionally, the fuel costs at nuclear power plants include small amounts of non-nuclear fuels that are necessary to continue essential plant operations during refueling or maintenance of the reactor.

When there are no plant-level data or, for earlier years, not enough data available to calculate average nuclear fuel prices for a state, various methods, described below, are used to estimate prices.

Physical unit prices: 2009 forward

For 2009 forward, SEDS uses the fuel costs of regulated nuclear power plants submitted to FERC, extracted from the power plant dataset maintained by SNL Financial, to calculate the annual average fuel costs per megawatthour for pressurized water reactors (PWR) and boiling water reactors (BWR). For plants with no reported fuel cost, the average PWR or BWR fuel cost is applied to net generation to derive the total fuel cost estimate. Total fuel costs and net generation data at the plant level are then aggregated to the state level and the average nuclear fuel prices are calculated using the method described above.

Physical unit prices: 2007 and 2008

For 2007 and 2008, a complete set of plant-level net electricity generation and nuclear fuel cost estimates is provided by EIA, Office of Electricity, Renewables, and Uranium Statistics (ERUS) and former Office of Coal, Nuclear, Electric, and Alternate Fuels (CNEAF), extracted from Ventyx Velocity Suite.

Physical unit prices: 2001 through 2006

For 2001 through 2006, when a state has nuclear electricity generation in SEDS, but no fuel cost data are available, a state average physical unit price is estimated by CNEAF, generally based on the average physical unit prices paid by the same type(s) of reactors in other states. For 2001-2004, in states where there are nuclear electricity generation and fuel cost data available for only some plants, only those plants with available data are used to calculate the state average price. Occasionally, a plant is excluded from the state price calculation because the cost data are significantly out of range with other plants in the state. The specific states and years with price assignments different than what is outlined above are shown with their price source in Table TN6.2.

Physical unit prices: 1992 through 2000

For 1992 through 2000, in states where there are nuclear electricity generation and fuel cost data for some plants, but not all, available data are used to calculate the state average price. In states where nuclear electricity generation for a specific plant is not available, the plant's fuel cost data also are excluded from the state price calculation. In addition, plants that have no fuel cost data available are excluded from the state price calculation because the cost data are significantly out of range with other plants in the state.

Remaining states with missing cost data are assigned prices using one of the following methods: directly assigning a nearby state or the U.S. price; applying the ratio of the previous year to the current year physical unit nuclear fuel prices for a nearby state to the state's physical unit nuclear fuel price for the previous year; or, assigning the state's average price of the preceding and subsequent year.

When a state has nuclear electricity generation in SEDS, but no fuel cost data are available, the national physical unit nuclear fuel price is used to estimate the state price. The ratio of the current year to the previous year national nuclear fuel price is applied to the state's physical unit nuclear fuel price for the previous year. The national prices used in the estimation are the national averages before missing state prices are assigned.

The states and years estimated using these methodologies are shown in Table TN6.3.

Physical unit prices: 1970 through 1991

For 1970 through 1991, when a state has nuclear electricity generation in SEDS, but no fuel cost data are available, the national physical unit nuclear fuel price is used to estimate the state price. The ratio of the current year to the previous year national nuclear fuel price is applied to the state's physical unit nuclear fuel price for the previous year. The national prices used in the estimation are the national averages before missing state prices are assigned. The states and years with specific price assignments are shown in Table TN6.3.

Table TN6.2. Nuclear electricity fuel price estimates, 2001 through 2006

State	Years	Price Source
IA	2006	EIA estimate based on 2001–2005 trend of cost decline
IL	2003	Average of 2002 & 2004 Quad Cities cost
	2005, 2006	Quad Cities costs assigned to all plants
MD	2005, 2006	St. Lucie costs assigned
MI	2005	Calvert Cliffs costs assigned
NJ	2002–2004	National year-to-year change
	2005	Oyster Creek assigned St. Lucie costs
	2006	Oyster Creek and Hope Creek assigned St. Lucie costs;
		Salem assigned Callaway costs
NY	2001	Average of Ginna & Nine Mile Point costs
	2002, 2003	Ginna costs assigned
OH	2006	Davis-Besse assigned Perry costs
PA	2005	Susquehanna and Limerick assigned Beaver Valley
		costs; Three Mile Island assigned Oconee costs
	2006	Susquehanna, Limerick, and Peach Bottom assigned
		Beaver Valley costs; Three Mile Island asigned average of Oconee, Crystal River, and Arkansas Nuclear One costs
TX	2005, 2006	Commanche assigned South Texas costs
WI	2006	Kewaunee assigned average price increase of
		Point Beach and Prairie Island

Additional notes

- Nuclear electricity generation levels are negative for Colorado in 1985, Tennessee in 1986 and 1987, Oregon in 1993 and Connecticut and Maine in 1997, indicating that the nuclear power plants used more energy than they supplied. In these cases, the fuel prices and expenditures are set to zero.
- For Missouri in 1985, a large credit resulting from litigation is assigned to fuel costs, creating an artificially low price. The 1986 Missouri price, which is in the range of the prices of other nuclear fuel plants, is used to estimate the 1985 price by applying the ratio of the 1985-to-1986 national prices.
- The 1985 U.S. Energy Information Administration (EIA) *Historical Plant Costs and Annual Production Expenses for Selected Electric Plants* has a

Table TN6.3. Nuclear electricity fuel price estimates, 1970 through 2000

State	Years	Price Source
AL	1973, 1974, 1976	National year-to-year change
AR	1980	National year-to-year change
AZ	1985	National year-to-year change
CO	1977, 1978, 1982–1984,	
	1986–1989	National year-to-year change
	1985	Assigned zero
CT	1997	Assigned zero
	1998	NH
FL	1997	Excludes Crystal River
GA	1974, 1978	National year-to-year change
	2000	Average of 1999 & 2001
IL	1997	Excludes LaSalle, Zion, & Clinton
	1998	Excludes LaSalle & Clinton
	2000	Excludes Clinton
ME	1972	National year-to-year change
	1997	Assigned zero
MA	1999–2000	VT
MI	1997	Excludes Big Rock Point
	1998, 1999	Excludes Cook
	2000	Excludes Palisades
MS	1984	National year-to-year change
MO	1984, 1985	National year-to-year change
NC	1982	National year-to-year change
NE	1999, 2000	IA
NJ	2000	Excludes Oyster Creek
NY	1998	Excludes Indian Point 2
OH	1986	National year-to-year change
OR	1975, 1993	Assigned zero
PA	1999	Excludes Three-Mile Island
	2000	Average of Beaver Valley & Peach Bottom
SC	1970	National year-to-year change
	1985	Adjusted for Catawba expenses
TN	1980, 1986, 1987	Assigned zero
WA	1970–1987	U.S.
WI	1970	National year-to-year change

footnote for the Duke Power Catawba plant in South Carolina stating that the reported production expenses represent only 12.5% of the actual production expenses. The production expenses used in the calculation for the Catawba plant are adjusted accordingly.

Data sources

Prices

2009 forward: EIA, based on data collected on FERC Form 1, "Annual Report of Major Electric Utilities, Licensees, and Others," extracted from SNL Financial's power plant dataset.

2007 and 2008: EIA, Office of Electricity, Renewables, and Uranium Statistics (ERUS) and former Office of Coal, Nuclear, Electric, and Alternate Fuels (CNEAF), from estimates compiled by Ventyx Velocity Suite, http://www.ventyx.com, based on data collected on FERC Form 1, "Annual Report of Major Electric Utilities, Licensees, and Others."

2004-2006: EIA, CNEAF, from data published in *NuclearFuel,* http://www.platts.com/Products/nuclearfuel, (a division of Platts, a McGraw-Hill Company). The data are collected on FERC Form 1, "Annual Report of Major Electric Utilities, Licensees, and Others."

2000-2003: EIA, CNEAF, from data published in *Nucleonics Week,* http://www.platts.com/Products/nucleonicsweek, (a division of Platts, a McGraw-Hill Company). The data are collected on FERC Form 1, "Annual Report of Major Electric Utilities, Licensees, and Others."

1997-1999: EIA, CNEAF, from data published in *Nucleonics Week,* http://www.platts.com/Products/nuclearfuel, (a division of Platts, a McGraw-Hill Company). The data are collected on FERC Form 1, "Annual Report of Major Electric Utilities, Licensees, and Others," and Form EIA-412, "Annual Report of Public Electric Utilities," http://www.eia.gov/electricity/data/eia412/.

1992-1996: EIA, CNEAF, from data compiled by the Utility Data Institute, (a McGraw-Hill Company). The data are collected on FERC Form 1, "Annual Report of Major Electric Utilities, Licensees, and Others," and Form EIA-412, "Annual Report of Public Electric Utilities," http://www.eia.gov/electricity/data/eia412/.

1988-1991: EIA, *Electric Plant Cost and Power Production Expenses*, Table 16 (1988-1990) and Table 14 (1991).

1982-1987: EIA, *Historical Plant Costs and Annual Production Expenses for Selected Electric Plants*, Table 18 (1982-1984) and Table 20 (1985-1987).

1979-1981: EIA, *Thermal Electric Plant Construction Cost and Annual Production*

Expenses, pages 267-279 (1979), Table 11 (1980 and 1981).

1975-1978: EIA, *Steam Electric Plant Construction Cost and Annual Production Expenses,* "Section II-Nuclear Plants."

1970-1974: Federal Power Commission, *Steam Electric Plant Construction Costs and Annual Production Expenses,* data sheets for Nuclear Plants (1970-1973), and "Section II-Nuclear Plants" (1974).

Consumption

1970 forward: EIA, State Energy Data System, electricity generated by nuclear power.

Conversion factors

1985 forward: EIA, annual U.S. average factors calculated using the heat rate reported on Form EIA-860, "Annual Electric Generator Report" (and predecessor forms), and the generation reported on Form EIA-923, "Power Plant Operations Report" (and predecessor forms). The factors are published in the State Energy Data Consumption Technical Notes, Appendix Table B1, http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.

1970 through 1984: EIA, annual U.S. average factors calculated by dividing the total heat content consumed in nuclear generating units by the total (net) electricity generated by those nuclear generating units. The heat content and electricity generation are reported on Form FERC-1 and Form EIA-412, and predecessor forms.

Electricity Imports and Exports

Electricity transmitted across U.S. borders with Canada and Mexico are included in the State Energy Data System electric power sector. Quantities and value of U.S. electricity imports and exports are available in the foreign trade statistics published by the U.S. Department of Commerce, Census Bureau. The annual U.S. total imports and exports quantities and revenues are used to calculate U.S. annual average prices that are assigned to each of the states with electricity trade. The prices in dollars per megawatthour are converted to dollars per million Btu using the factor of 3,412 Btu per kilowatthour for 1989 forward. Imports and exports quantity and revenue data are not available for calculating prices for 1970 through 1988; prices for those years are estimated by applying annual percentage changes in industrial sector electricity prices to the 1989 U.S. average electricity imports and exports prices.

Data sources

Prices

1989 forward: U.S. Department of Commerce, Census Bureau, general import and domestic export data, SITC Number 35100, extracted from the U.S. International Trade Commission's Interactive Tariff and Trade DataWeb database, http://dataweb.usitc.gov.

1970-1988: EIA, State Energy Data System, industrial sector electricity prices.

Consumption

1970 forward: EIA, State Energy Data System, electricity imports and electricity exports.

Conversion factor, all years

3,412 Btu per kilowatthour.

Section 7. Consumption Adjustments for Calculating Expenditures

Expenditures developed in the EIA State Energy Data System (SEDS) are calculated by multiplying the price estimates by the SEDS consumption estimates. The consumption estimates are adjusted to remove process fuel, intermediate petroleum products, electricity exports, and other consumption that has no direct fuel costs, i.e., hydroelectric, geothermal, wind, solar thermal and photovoltaic energy sources, and some wood and waste.

Almost all aspects of energy production, processing, and distribution consume energy as an inherent part of those activities. SEDS industrial and transportation sector consumption estimates include energy consumed in the process of providing energy to the end-use consumer and are called "process fuel." Familiar examples include energy sources used in drilling for oil and gas and transporting natural gas and petroleum by pipeline. Another "process fuel" is the energy used in generating and delivering electricity to end users. Energy products that are subsequently incorporated into another energy product for end-use consumption are called "intermediate products." Motor gasoline blending components are familiar examples of intermediate products that are consumed as part of the finished motor gasoline sold at service stations and other outlets.

Process fuel and intermediate products are not purchased by the end user and, therefore, do not have prices. Although the end user does not consume either process fuel or intermediate products directly, he does pay for them, because the cost to the processor or distributor is passed on to the end user in the price of the final end-user product. If their use was left in the consumption estimates and was assigned prices, the expenditures would be counted twice, first as paid by the "processor" (producer, processor, or transporter) and again as included in the price to the end user.

Some renewable energy sources are not purchased. These include hydroelectric, geothermal, wind, photovoltaic, and solar thermal energy. The consumption of these sources, which are measured in SEDS as kilowatthours of electricity produced, are not included in the state energy expenditure estimates since there are no "fuel costs" involved. Wood and waste can be purchased or obtained at no cost. Wood consumption estimates in the residential sector, and wood and waste in the commercial and industrial sectors are adjusted in SEDS to remove estimated quantities that were obtained at no cost.

To estimate energy expenditures in the price and expenditure tables, the consumption of process fuel, intermediate products, and some of the renewable energy sources are subtracted from the end-use sector in which they are included in SEDS, either the residential, commercial, industrial, or transportation sector, and there are no prices associated with them.

Process fuel consumption adjustments include:

1. Fuel (petroleum, natural gas, steam coal) and electricity consumed at refineries
2. Crude oil lease, plant, and pipeline fuel
3. Natural gas lease and plant fuel
4. Natural gas pipeline fuel
5. Electrical system energy losses (i.e., energy consumed in the generation, transmission, and distribution of electricity)
6. Energy losses and co-products from the production of fuel ethanol

Intermediate product consumption adjustments include:

1. Aviation gasoline blending components
2. Motor gasoline blending components
3. Natural gasoline (1970 through 1983)
4. Pentanes plus (1984 forward)
5. Plant condensate (1970 through 1983)
6. Unfinished oils
7. Unfractionated streams (1970 through 1983)

Starting in 1984, natural gasoline (including isopentane) and plant condensate are reported together as the new product, pentanes plus, and the components of unfractionated streams are reported separately under liquefied petroleum gases.

Renewable energy consumption adjustments include:

1. Photovoltaic and solar thermal energy in the residential, commercial, industrial, and electric power sectors;
2. Geothermal energy in the residential, commercial, industrial, and electric power sectors;

3. Electricity generated from hydropower in the commercial, industrial, and electric power sectors; and
4. Electricity generated from wind energy in the commercial, industrial, and electric power sectors; and
5. Estimated portions of wood consumed in the residential sector, and wood and waste in the commercial and industrial sectors that were obtained at no cost.

In addition, while consumption of supplemental gaseous fuels (SGF) are removed from SEDS total consumption estimates to prevent double-counting in both natural gas and the fossil fuels from which they are derived, prices and expenditures of SGF cannot be separately identified and are therefore not adjusted for double-counting in total energy average prices and total energy expenditure calculations.

Table TN7.1 shows the quantities of energy, by state, removed from SEDS consumption to calculate expenditures for 2014. Table TN7.2 shows the adjustments made to SEDS national consumption estimates for 1970 through 2014 to derive the net consumption data used to calculate expenditures.

State adjustment estimates from 1970 forward are available in the SEDS Internet data file, http://www.eia.gov/state/seds/sep_update/pr_adjust_consum_update.csv.

Adjustment procedures

Hydroelectricity, geothermal, wind, photovoltaic, and solar thermal energy. Electricity generated from hydropower and geothermal, wind, photovoltaic, and solar thermal energy has no fuel cost. Operation and maintenance costs associated with these energy sources are included indirectly in the prices of the electricity sold by power producers. Therefore, use of these renewable sources for electricity generation is removed from the expenditure calculations. Direct use of geothermal and solar energy also has no fuel cost and is omitted from SEDS energy expenditure calculations.

Residential wood. Some residential wood is purchased and some acquired at no cost. Based on responses to the Form EIA-457, "1980 Residential Energy Consumption Survey," Census division percentages of wood purchased were developed and applied to the residential wood consumption in each state in the divisions in 1970 through 1989. Based on responses to the Form EIA-457, "1993 Residential Energy Consumption Survey," Census region percentages were developed and applied to the residential wood consumption of the states in each region in 1990 forward. Table TN7.3 shows the percentage of purchased wood for each Census division or region.

Commercial wood and waste. Some commercial wood and waste is purchased and some acquired at no cost. Conventional commercial wood purchased was estimated using the same percentages used for the residential sector (see Table TN7.3). Wood and waste acquired at no cost by commercial combined heat-and-power facilities for 1989 through 2011 was estimated using the U.S. annual average percentages of wood and percentages of waste acquired at no cost by the electric power sector. For 2012 forward, because of lack of information, these percentages are no longer estimated and are assumed to be zero.

Industrial wood and waste. The cost of wood and waste products used for energy vary widely from more expensive woods to free industrial waste products. Industrial consumption is broken into two segments, manufacturing industries and combined heat and power (CHP) facilities in order to estimate quantities received at no cost.

Adjustments to manufacturing wood and waste consumption in 1994 forward are based on information gathered on the Form EIA-846, "1994 Manufacturing Energy Survey (MECS)." Adjustments to manufacturing consumption in 1980 through 1993 are based on information gathered on the Form EIA-846, "1991 Manufacturing Energy Survey." Adjustments to industrial wood and waste consumption in 1970 through 1979 are based on the 1980 average ratios for each state. The 1991 and 1994 MECS report the quantities consumed and quantities purchased of five types of wood and waste in each of four (MECS 1991) or five (MECS 1994) SIC categories of industries. The two quantity series are used to calculate SIC category average percentages of wood and waste obtained at no cost. These percentages are applied to the estimated consumption in those SIC categories in each state to estimate the state's manufacturing uncosted wood and waste.

Estimates of wood and waste obtained at no charge by industrial CHP facilities for 1989 through 2011 are estimated using the U.S. annual average percentages of wood and percentages of waste acquired at no cost by the electric power sector. For 2012 forward, because of lack of information, these percentages are no longer estimated and are assumed to be zero.

Each state's industrial wood and waste consumption quantities acquired at no cost are the sum of the estimated manufacturing and CHP facilities' quantities for each year.

Refinery fuel. Petroleum refinery consumption of distillate fuel, residual fuel, liquefied petroleum gases, petroleum coke, still gas, natural gas, steam coal, and electricity is estimated for each state and subtracted from the state's industrial sector total of each energy source.

Estimation of petroleum coke consumed by the refineries is described in

Table TN7.1. Energy consumption adjustments for calculating expenditures by state, 2014 (billion Btu)

State	Refinery Fuel and Intermediate Products							
	Distillate Fuel Oil	Residual Fuel Oil	LPG	Other Petroleum [a]	Natural Gas [b]	Coal	Electricity [c]	Total
AK	46	—	—	17,369	3,752	—	444	21,610
AL	12	—	—	9,572	8,992	—	1,280	19,855
AR	6	—	10	8,722	6,757	—	966	16,461
AZ	—	—	—	—	—	—	—	—
CA	445	—	1,346	221,393	152,460	—	9,854	385,497
CO	—	—	80	11,560	4,663	—	1,071	17,374
CT	—	—	—	—	—	—	—	—
DC	—	—	—	—	—	—	—	—
DE	—	—	—	23,166	9,572	—	1,314	34,052
FL	—	—	—	—	—	—	—	—
GA	—	—	—	—	—	—	—	—
HI	35	1,616	—	13,850	—	—	92	15,592
IA	—	—	—	—	—	—	—	—
ID	—	—	—	—	—	—	—	—
IL	46	38	1,588	109,044	31,306	—	10,918	152,940
IN	23	19	727	48,483	16,924	—	5,026	71,201
KS	17	13	—	34,406	22,324	—	3,839	60,599
KY	12	13	408	27,227	9,577	—	2,822	40,058
LA	289	69	405	372,752	158,453	—	31,472	563,440
MA	—	—	—	—	—	—	—	—
MD	—	—	—	—	—	—	—	—
ME	—	—	—	—	—	—	—	—
MI	6	6	215	13,247	4,998	—	1,484	19,956
MN	17	13	595	37,239	14,017	—	4,111	55,993
MO	—	—	—	—	—	—	—	—
MS	35	—	45	35,343	27,428	—	3,876	66,726
MT	—	—	—	21,847	8,821	—	2,945	33,613
NC	—	—	—	—	—	—	—	—
ND	6	—	152	9,608	3,717	—	1,058	14,541
NE	—	—	—	—	—	—	—	—
NH	—	—	—	—	—	—	—	—
NJ	—	—	—	57,400	24,429	—	3,371	85,200
NM	12	—	—	12,935	9,658	—	1,358	23,962
NV	—	—	—	159	35	—	—	195
NY	—	—	—	—	—	—	—	—
OH	29	19	917	60,313	22,698	—	6,186	90,161
OK	23	19	—	50,672	29,735	—	5,377	85,827
OR	—	—	—	—	—	—	—	—
PA	—	19	—	69,362	11,973	350	4,292	85,996
RI	—	—	—	—	—	—	—	—
SC	—	—	—	—	—	—	—	—
SD	—	—	—	—	—	—	—	—
TN	12	6	—	19,395	6,962	—	2,054	28,429
TX	652	107	996	667,418	277,647	—	46,547	993,367
UT	—	—	—	19,742	8,641	—	1,273	29,656
VA	—	—	—	—	—	—	—	—
VT	—	—	—	—	—	—	—	—
WA	64	—	429	64,732	34,972	—	5,664	105,861
WI	—	—	62	3,821	1,479	—	433	5,795
WV	—	—	—	1,777	1,197	25	160	3,160
WY	—	—	—	19,903	8,043	—	1,846	29,791
US	1,784	1,955	7,975	2,062,456	921,231	375	161,132	3,156,909

See footnotes at end of table.

Table TN7.1. Energy consumption adjustments for calculating expenditures by state, 2014 (billion Btu) (continued)

State	Residential		Commercial		Industrial					Transportation		
	Non-combustible Renewable Energy [d]	Wood	Non-combustible Renewable Energy [d]	Wood and Waste	Crude Oil Lease, Plant, and Pipeline Fuel	Natural Gas Lease and Plant Fuel	Non-combustible Renewable Energy [d]	Wood and Waste	Ethanol Production Losses [e]	Natural Gas Pipeline Fuel	Electrical System Energy Losses	Total
AK	111	1,430	85	169	—	256,688	—	30	—	310	40,600	321,033
AL	250	4,672	—	553	—	16,907	42	14,052	—	19,130	587,448	662,908
AR	945	6,714	—	795	—	7,476	12	6,477	—	11,822	327,855	378,556
AZ	17,044	1,910	272	226	—	3	247	74	2,313	13,878	515,170	551,138
CA	86,123	24,844	1,586	2,942	—	58,080	1,277	5,432	9,883	23,475	1,578,948	2,178,088
CO	5,447	6,203	401	735	—	109,497	299	114	6,940	8,790	383,611	539,410
CT	3,601	2,674	—	317	—	—	—	1,932	—	4,771	180,581	193,875
DC	329	17	—	2	—	—	—	—	—	1,353	84,270	85,971
DE	1,127	910	64	108	—	—	—	9	—	1,094	74,738	112,102
FL	57,266	10,223	2,096	1,211	—	6,977	—	5,663	—	3,546	1,368,073	1,455,056
GA	1,500	8,525	31	1,009	—	—	178	14,288	5,575	7,118	916,860	955,083
HI	10,277	228	6	27	—	—	500	7	—	1	59,822	86,459
IA	918	4,356	777	516	—	—	—	8,752	205,187	13,127	350,168	583,801
ID	201	2,573	613	305	—	—	758	311	3,318	3,975	166,231	178,284
IL	4,667	11,022	64	1,305	—	366	—	3,403	68,576	30,907	1,069,420	1,342,669
IN	4,234	9,539	826	1,129	—	181	—	8,223	54,515	7,165	873,261	1,030,273
KS	369	3,554	672	421	—	17,188	—	78	28,187	23,063	315,846	449,979
KY	2,049	9,824	852	1,163	—	4,794	—	3,188	1,966	8,658	615,555	688,107
LA	2,445	1,652	852	196	—	177,306	42	11,350	76	47,122	544,845	1,349,324
MA	11,499	4,627	1,139	548	—	—	82	3,108	—	6,454	364,012	391,469
MD	3,944	6,996	34	828	—	1	—	827	—	6,644	473,203	492,479
ME	420	6,480	—	767	—	—	3,727	6,132	—	1,341	57,525	76,391
MI	5,606	14,688	874	1,739	—	7,248	275	12,142	14,890	19,750	748,220	845,388
MN	1,720	11,032	289	1,306	—	—	184	6,596	62,160	13,068	471,389	623,737
MO	2,089	20,563	—	2,435	—	—	—	1,427	14,214	6,267	638,950	685,945
MS	210	3,863	741	457	—	2,882	42	3,483	—	20,385	289,252	388,041
MT	187	2,119	144	251	—	2,515	70	205	—	4,235	105,565	148,905
NC	3,003	11,789	867	1,396	—	—	—	8,028	—	3,952	905,914	934,948
ND	543	363	445	43	—	15,327	—	861	20,090	15,524	133,799	201,535
NE	552	2,039	720	241	—	64	—	203	91,572	7,342	225,717	328,450
NH	359	3,744	—	443	—	—	—	990	—	84	76,233	81,853
NJ	21,297	4,971	1,019	589	—	—	10	1,412	—	5,298	503,546	623,342
NM	1,752	4,602	102	545	—	87,702	241	75	1,272	8,867	164,119	293,238
NV	4,266	1,201	1,080	142	—	3	440	42	—	5,075	200,743	213,187
NY	8,139	8,771	776	1,039	—	558	676	6,960	9,106	25,718	911,177	972,919
OH	4,491	16,712	868	1,979	—	4,931	335	7,365	29,316	13,241	1,073,094	1,242,492
OK	86	3,857	—	457	—	90,303	—	3,745	—	47,194	421,987	653,456
OR	3,747	10,603	676	1,256	—	26	166	5,198	2,276	3,766	292,467	320,180
PA	5,540	10,930	853	1,294	—	130,599	78	14,602	6,108	38,118	1,012,518	1,306,635
RI	160	635	72	75	—	—	—	21	—	2,910	41,022	44,895
SC	802	2,745	28	325	—	—	—	11,176	—	2,466	608,394	625,934
SD	660	1,315	967	156	—	856	251	485	56,245	5,403	88,313	154,649
TN	725	5,372	26	636	—	277	—	8,241	12,493	6,073	753,141	815,412
TX	4,453	8,558	1,136	1,013	—	421,590	—	6,575	17,074	283,294	2,628,973	4,366,033
UT	611	695	356	82	—	31,473	357	58	—	14,694	200,574	278,555
VA	2,023	11,325	885	1,341	—	7,554	99	5,693	2,341	7,733	822,875	861,870
VT	739	3,874	—	459	—	—	—	101	—	126	15,938	21,236
WA	1,226	11,691	778	1,384	—	—	—	7,441	—	9,318	652,031	789,729
WI	1,436	16,032	—	1,898	—	—	1,569	15,162	28,534	3,751	519,541	593,719
WV	156	12,553	3	1,486	—	37,209	5,029	338	—	31,333	223,169	314,437
WY	89	751	528	89	—	49,603	65	30	632	15,623	126,102	223,304
US	291,428	336,361	24,602	39,829	—	1,546,184	17,050	222,103	754,861	864,348	25,802,806	33,056,480

[a] In this table, "other petroleum" consists of: still gas and petroleum coke consumed as refinery fuel; and aviation gasoline blending components, motor gasoline blending components, pentanes plus, and unfinished oils used as intermediate products.
[b] Natural gas including supplemental gaseous fuels.
[c] Electricity is converted at the rate of 3,412 Btu per kilowatthour.
[d] Hydroelectric power, geothermal, solar, and wind energy. Distributed photovoltaic and solar thermal energy consumed in the commercial and industrial sectors that cannot be separately identified are included in residential consumption.
[e] Energy losses and co-products from the production of fuel ethanol without denaturant.
— = No consumption. NA = Not available.
Source: EIA, State Energy Data System.

Table TN7.2. Energy consumption adjustments for calculating expenditures, selected years, 1970 through 2014 (trillion Btu)

Year	Total (Gross) Consumption	Adjustments													Consumption used in Expenditure Calculations [c]
		Residential		Commercial		Industrial						Transportation			
		Non-combustible Renewable Energy [a]	Wood	Non-combustible Renewable Energy [a]	Wood and Waste	Refinery Fuel and Intermediate Products	Crude Oil Lease, Plant, and Pipeline Fuel	Natural Gas Lease and Plant Fuel	Non-combustible Renewable Energy [a]	Wood and Waste	Ethanol Production Losses [b]	Natural Gas Pipeline Fuel	Electrical System Energy Losses	Total	
1970	67,742	—	298	—	6	2,714	—	1,442	34	789	—	740	11,497	17,521	50,221
1975	71,987	—	316	—	6	2,883	—	1,434	32	824	—	595	14,304	20,394	51,593
1976	76,002	—	357	—	7	2,906	—	1,679	33	944	—	559	15,154	21,640	54,363
1977	77,988	—	402	—	8	3,007	—	1,706	33	991	—	544	15,898	22,588	55,400
1978	80,022	—	462	—	9	2,937	—	1,694	32	1,083	—	541	16,680	23,438	56,584
1979	80,882	—	543	—	10	3,077	—	1,534	34	1,087	—	613	16,879	23,776	57,106
1980	78,093	—	627	—	16	3,052	—	1,058	33	1,283	—	650	17,178	23,897	54,347
1981	76,142	—	651	—	16	2,203	—	959	33	1,354	6	660	17,161	23,043	53,272
1982	73,059	—	724	—	16	2,088	—	1,144	33	1,310	16	614	16,835	22,780	50,423
1983	72,934	—	722	—	16	2,121	140	1,010	33	1,480	29	505	17,262	23,319	49,746
1984	76,571	—	733	—	16	2,254	135	1,113	33	1,510	35	545	17,790	24,165	52,515
1985	76,464	—	755	—	18	2,045	128	1,001	33	1,503	42	521	18,164	24,211	52,378
1986	76,639	—	688	—	20	2,285	103	954	33	1,478	48	501	18,135	24,247	52,506
1987	79,006	—	634	—	22	2,485	72	1,194	33	1,472	55	538	18,558	25,063	54,041
1988	82,760	—	676	—	24	2,696	85	1,134	33	1,531	55	633	19,478	26,346	56,514
1989	84,777	57	684	3	73	2,710	59	1,103	30	684	56	650	20,850	26,958	57,923
1990	84,507	61	337	4	59	2,802	51	1,269	33	716	49	682	21,255	27,319	57,306
1991	84,436	63	353	4	60	2,668	39	1,164	32	685	56	621	21,444	27,190	57,352
1992	85,788	66	371	4	66	2,954	27	1,208	33	689	64	608	21,309	27,399	58,502
1993	87,394	68	308	4	68	2,877	21	1,199	32	642	74	643	22,097	28,034	59,474
1994	89,115	69	292	5	66	2,991	19	1,153	65	662	82	706	22,400	28,511	60,709
1995	91,094	71	292	6	66	2,914	15	1,253	58	445	86	723	23,214	29,142	62,058
1996	94,091	72	303	7	77	3,203	14	1,280	64	495	61	734	23,916	30,226	63,970
1997	94,750	72	233	7	80	3,196	5	1,251	61	493	80	781	24,167	30,426	64,423
1998	95,031	72	207	8	71	3,042	—	1,212	58	493	86	657	25,102	31,008	64,119
1999	96,630	71	213	9	66	3,050	—	1,103	53	495	90	663	25,689	31,501	65,223
2000	98,810	69	229	9	67	2,950	—	1,181	47	459	99	661	26,405	32,175	66,720
2001	96,146	68	210	9	46	3,152	—	1,139	37	437	108	641	25,663	31,509	64,717
2002	97,651	68	213	9	43	3,027	—	1,135	44	312	130	683	26,210	31,874	65,842
2003	97,921	70	225	12	46	3,141	—	1,147	46	315	168	609	26,117	31,895	66,091
2004	100,103	71	230	13	46	3,123	—	1,123	36	536	201	582	26,607	32,568	67,593
2005	100,191	74	249	14	49	3,130	—	1,138	36	335	227	601	27,149	33,004	67,246
2006	99,456	82	221	15	46	3,210	—	1,171	33	277	280	602	26,907	32,844	66,674
2007	101,005	92	244	15	46	3,180	—	1,257	20	292	368	640	27,542	33,697	67,381
2008	R 98,879	107	273	15	47	2,983	—	1,250	22	282	518	667	27,245	33,408	65,554
2009	94,116	122	292	17	48	2,922	—	1,304	22	456	602	689	25,814	32,289	61,914
2010	97,446	151	255	19	45	3,127	—	1,316	20	283	726	692	26,826	33,460	64,076
2011	96,827	193	261	21	45	3,106	—	1,355	22	270	754	705	26,516	33,250	63,665
2012	94,411	226	244	22	34	3,188	—	1,433	27	262	709	751	25,545	32,441	62,058
2013	R 97,141	259	336	24	40	R 3,270	—	R 1,524	38	R 224	707	R 859	R 25,665	R 32,944	R 64,249
2014	98,385	291	336	25	40	3,157	—	1,546	17	222	755	864	25,803	33,056	65,386

[a] Hydroelectric power, geothermal, solar, and wind energy. Distributed photovoltaic and solar thermal energy consumed in the commercial and industrial sectors that cannot be separately identified are included in residential consumption.

[b] Energy losses and co-products from the production of fuel ethanol without denaturant.

[c] Includes adjustments of supplemental gaseous fuels and processed fuels not shown on this table.

Where shown, R = Revised data and — = No consumption.

NA = Not available.

Note: Totals may not equal sum of components due to independent rounding.• All data are available via the full-precision data file (CSV) at http://www.eia.gov/state/seds/seds-data-fuel.cfm?sid=US.

Sources: EIA, State Energy Data System.

Table TN7.3. Percentage of purchased wood in residential wood consumption

1960–1989 Census Division	Percent	1990 forward Census Region	Percent
New England	40%	Northeast	61%
MIddle Atlantic	29%	Midwest	32%
East North Central	18%	South	39%
West North Central	17%	West	42%
South Atlantic	30%		
East South Central	18%		
West South Central	38%		
Mountain	12%		
Pacific	31%		

Section 4 of the SEDS Consumption Technical Notes at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.

Refinery consumption of still gas, excluding still gas consumed as petrochemical feedstocks, is subtracted from the SEDS industrial sector total for 1970 through 1985. Beginning in 1986, EIA data series no longer report refinery fuel and feedstock use separately, and all industrial still gas consumption is removed. Estimation of still gas consumption is described in Section 4 of the SEDS Consumption Technical Notes at http://www.eia.gov/state/seds/seds-technical-notes-complete.cfm.

Refinery consumption of each of the other fuels is available in the data sources by state or group of states (1970 through 1980) and by Petroleum Administration for Defense (PAD) district (1981 forward). For 2013 forward, SEDS incorporates unpublished state-level refinery fuel consumption data that satisfied two statistical disclosure rules—that there are at least three refineries not of the same company in the state and that no one refinery uses more than 60% of the particular fuel. The number of states with usable data varies by fuel, from zero for coal and residual fuel oil to 12 for electricity.

For each fuel, consumption for all the usable states within each PAD district is subtracted from the district's fuel consumption. This remainder is then allocated to the other states in the district according to their operable refining capacities. To reduce the possibility of over-allocating refinery fuel use to states that do not consume much of the fuel, states where industrial sector consumption of a specific fuel is less than 0.05% (for natural gas, electricity, distillate fuel oil, and LPG) or 0.1% (for coal and residual fuel oil) of the U.S. industrial sector total consumption are not included in the allocation.

Prior to 2013, state-level refinery consumption of each of the other fuels is estimated by allocating the regional data (for state groups before 1981 and PAD district for 1981 through 2012) to the states with operating refineries according to their shares of the region's industrial sector consumption of the fuel.

In some cases, the estimated state refinery fuel consumption of residual fuel or LPG exceeds the estimate of the total industrial sector consumption of that fuel for that state. For 1970 through 2006, the refinery fuel consumption for the PAD district, group of states, or individual state is reduced until each state has positive industrial consumption. The excess refinery fuel is reallocated to a different PAD district, group of states, or individual state as shown in Table TN7.4. When this adjustment involves a PAD district or group value, the refineries' consumption estimates for all states within the PAD district or group are recalculated using these new values. From 2007 forward, this adjustment is no longer made.

Refinery consumption of coal is withheld in the data source for 1999 and 2000 and unpublished estimates developed by the data source office are used for 1999 and 2000. For 2001 and 2002, the U.S. values for refinery consumption of coal are published although the PAD district values are withheld. The PAD district values for 2001 and 2002 are estimated by applying the PAD districts' percentages of the U.S. total in 2000 to the U.S. totals for 2001 and 2002.

Because crude oil consumption is not an individual fuel in SEDS for 1970 through 1980, the small amounts of crude oil that were used at refineries during those years were allocated to residual and distillate fuels consumed at refineries. The allocation from crude oil refinery use to residual and distillate fuels refinery use was made according to each fuel's share of the total crude oil used directly (including losses) as residual and distillate fuels from the EIA *Petroleum Supply Annual, Volume 1,* of each year, Table 2.

Intermediate products. Aviation gasoline blending components, motor gasoline blending components, natural gasoline (1970 through 1983), pentanes plus (1984 forward), plant condensate (1970 through 1983), unfinished oils, and unfractionated streams (1970 through 1983) are used at refineries and blending plants to make end-use petroleum products, particularly motor gasoline. Accordingly, consumption of these products is completely removed.

Crude oil lease, plant, and pipeline fuel. Industrial crude oil is assumed to be used as lease, plant, and pipeline fuel. Because these are process fuel uses, this crude oil is removed from SEDS industrial sector consumption.

Natural gas lease and plant fuel. Natural gas consumed as lease and plant fuel is process fuel and is subtracted from SEDS industrial sector natural gas totals by state and year.

Table TN7.4. Reallocations of excess refinery fuel consumption, 1970 through 2005

Year	Fuel	Thousand Barrels	Excess in:	Reallocated to:
1971	Residual Fuel Oil	294	Kansas	Oklahoma
1973	Residual Fuel Oil	45	Group 4: Kentucky, Tennessee	Illinois
1979	LPG	173	Montana	Wyoming
1985	Residual Fuel Oil	212	PAD District 4	PAD District 5
1986	Residual Fuel Oil	403	PAD District 4	PAD District 5
1987	Residual Fuel Oil	497	PAD District 4	PAD District 5
1988	Residual Fuel Oil	305	PAD District 4	PAD District 5
1989	Residual Fuel Oil	381	PAD District 4	PAD District 5
1990	Residual Fuel Oil	336	PAD District 4	PAD District 5
1991	Residual Fuel Oil	378	PAD District 4	PAD District 5
1992	Residual Fuel Oil	361	PAD District 4	PAD District 5
1996	Residual Fuel Oil	184	PAD District 4	PAD District 5
1997	Residual Fuel Oil	100	PAD District 4	PAD District 5
1998	Residual Fuel Oil	82	PAD District 4	PAD District 5
1999	Residual Fuel Oil	142	PAD District 4	PAD District 5
2000	Residual Fuel Oil	224	PAD District 4	PAD District 5
2001	Residual Fuel Oil	149	PAD District 4	PAD District 2
2001	Residual Fuel Oil	95	PAD District 5	PAD District 2
2001	Residual Fuel Oil	281	PAD District 5	PAD District 1
2002	Residual Fuel Oil	33	PAD District 5	PAD District 3
2002	Residual Fuel Oil	67	PAD District 5	PAD District 4
2003	Residual Fuel Oil	228	PAD District 5	PAD District 3
2004	Residual Fuel Oil	296	PAD District 5	PAD District 3
2005	LPG	198	PAD District 5	PAD District 4

Source: EIA calculations based on data from the State Energy Data System and the *Petroleum Supply Annual*.

Natural gas for pipeline and distribution use. Most of the natural gas consumed in the transportation sector is used to power pipelines. As such, it is a process fuel and is subtracted from SEDS consumption in order to calculate expenditures.

Electricity exports. Electricity exported to Canada and Mexico are excluded from the calculations of U.S. domestic energy expenditures and U.S. average energy prices.

Electrical system energy losses. The amount of energy lost during generation, transmission, and distribution of electricity (including plant use and unaccounted for electrical energy) is process fuel and is subtracted from sectoral energy consumption estimates used in the price and expenditure tables. The energy losses are "paid for" when residential, commercial, industrial, and transportation sector consumers buy the electricity produced by the electric power sector.

Energy losses and co-products from the production of fuel ethanol. Fuel ethanol is produced from corn and other biomass inputs that are not included elsewhere as energy sources. The difference in heat content of the feedstock and the fuel ethanol is considered process fuel and is subtracted from sector energy consumption estimates used in the price and expenditure tables.

Data sources

Capacity of petroleum refineries. 1982 forward: EIA, *Refinery Capacity Report*, http://www.eia.gov/petroleum/refinerycapacity/ or *Petroleum Supply Annual, Volume 1*, http://www.eia.gov/petroleum/supply/annual/volume1/ tables titled "Number and Capacity of Operable Petroleum Refineries," columns titled, "Crude Capacity, Barrels per Calendar Day, Operating" (1982-1985), and "Atmospheric Crude Oil Distillation Capacity, Barrels per Calendar Day, Operating" (1986 forward).

1979-1981: EIA, Energy Data Reports, *Petroleum Refineries in the United States and U.S. Territories*, table titled "Number and Capacity of Petroleum Refineries," column heading, "Crude Capacity, Barrels per Calendar Day, Operating."

1978: EIA, Energy Data Reports, *Petroleum Refineries in the United States and Puerto Rico*, table titled "Number and Capacity of Petroleum Refineries," column heading, "Crude Capacity, Barrels per Calendar Day, Operating."

1970-1977: Bureau of Mines, U.S. Department of the Interior, Mineral Industry Surveys, *Petroleum Refineries in the United States and Puerto Rico*, table titled "Number and Capacity of Petroleum Refineries," column heading, "Crude Capacity, Barrels per Calendar Day, Operating."

Fuel consumed at refineries. 2013 forward: EIA unpublished data on fuels consumed at refineries for selected states.

1981-1994, 1996, and 1998 forward: EIA, *Petroleum Supply Annual, Volume 1*, http://www.eia.gov/petroleum/supply/annual/volume1/ table titled "Fuels Consumed at Refineries by PAD District." Data for 1991 are from a separately published EIA *Errata* dated November 10, 1992, GPO Stock No. 061-003-00758-9.

1995, 1997: EIA, *Petroleum Supply Annual, Volume 1*, table titled "Fuels Consumed at Refineries by PAD District." Data for coal, electricity, and natural gas are not published, and values for the previous year are repeated.

1976-1980: EIA, Energy Data Reports, *Crude Petroleum, Petroleum Products, and Natural Gas Liquids*, table titled "Fuels Consumed for All Purposes at Refineries in the United States, by States."

1970-1975: Bureau of Mines, U.S. Department of the Interior, Mineral Industry Surveys, *Crude Petroleum, Petroleum Products, and Natural Gas Liquids*, table titled "Fuels Consumed for All Purposes at Refineries in the United States, by States."

Intermediate products. 1970 forward: EIA, State Energy Data System, industrial sector consumption estimates for aviation gasoline blending components, crude oil, motor gasoline blending components, natural gasoline (1970-1983), pentanes plus (1984 forward), petroleum coke, plant condensate (1970-1983), still gas (excluding still gas consumed as petrochemical feedstocks, 1970-1985), unfinished oil, and unfractionated streams (1970-1983).

Natural gas lease, plant, and pipeline fuel use. 1997 forward: EIA, *Natural Gas Annual*, Tables 26 through 76. Also available at http://www.eia.gov/dnav/ng/ng_cons_sum_dcu_nus_a.htm.

1993-1996: EIA *Historical Natural Gas Annual 1930 Through 2000,* http://www.eia.gov/oil_gas/natural_gas/data_publications/historical_natural_gas_annual/hnga.html Table 15.

1970-1992: EIA *Natural Gas Annual 1994, Volume II,* Table 14.

Residential wood. 1990 forward: EIA, unpublished data from the "1993 Residential Energy Consumption Survey," Form EIA-457 http://www.eia.gov/consumption/residential/index.cfm.

1970-1989: EIA, unpublished data from the "1980 Residential Energy Consumption Survey," Form EIA-457.

Commercial wood and waste. 1990 forward: EIA, unpublished data from the "1993 Residential Energy Consumption Survey," Form EIA-457 http://www.eia.gov/consumption/residential/index.cfm.

1989-2011: EIA, SEDS, U.S. annual average percentages of wood and percentages of waste acquired at no cost by the electric power sector. See data sources for estimating wood and waste prices for the electric power sector in Section 5.

1970-1989: EIA, unpublished data from the "1980 Residential Energy Consumption Survey," Form EIA-457.

Industrial wood and waste. 1994 forward: EIA, unpublished data from the "1994 Manufacturing Energy Consumption Survey" (Form EIA-846) http://www.eia.gov/consumption/manufacturing/.

1989-2011: EIA, SEDS, U.S. annual average percentages of wood and percentages of waste acquired at no cost by the electric power sector. See data sources for estimating wood and waste prices for the electric power sector in Section 5.

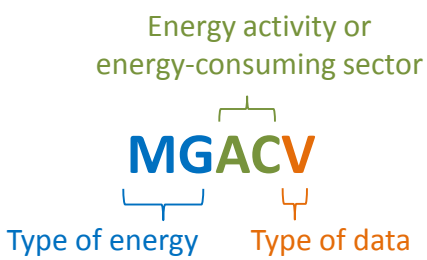
1970-1993: EIA, unpublished data from the "1991 Manufacturing Energy Consumption Survey" (Form EIA-846).

Appendix A. Mnemonic Series Names (MSN)

This appendix contains alphabetical listings of the variables used in the price and expenditure module of the State Energy Data System (SEDS). The first list presents the price and expenditure variables, and the second presents the consumption adjustment variables as described in Section 7, "Consumption Adjustments for Calculating Expenditures."

Provided for each variable are: a brief description; unit of measure; and the formulas used to create the variable. If a variable is not one calculated in SEDS but is entered into the system, it is described as an independent variable. Formulas for the state calculations have "ZZ" following the variable name, where "ZZ" represents the two-letter postal code of a state, and formulas for the United States have "US" following the variable name. If the formula for the states and the United States are the same, only one formula is shown.

Variables in SEDS have five-letter names that generally consist of the following components:



For a detailed explanation of the naming convention, see Section 1, "Documentation Guide."

In general, state-level price estimates are independent variables and are expressed in dollars per million Btu. Estimates of state-level expenditures are calculated by multiplying the appropriate consumption estimates by the corresponding prices and converting to million dollars. The consumption variables are taken from the SEDS consumption module and some are adjusted for process fuel, intermediate products, and fuels with no direct cost (see discussion in Section 7). Expenditures for the United States are the sum of the 50 states and the District of Columbia. Prices for the United States are the sum of the states' expenditures divided by the sum of the states' consumption or adjusted consumption, converted to dollars per million Btu.

If the consumption variables in a formula are taken directly from the SEDS consumption module (i.e., not adjusted), they are listed in Appendix A of the Consumption Technical Notes (http://www.eia.gov/state/seds/sep_prices/notes/pr_a.pdf) and are not reproduced in this appendix. Generally, if the third and fourth letters of the consumption variables are the same as the corresponding price and expenditure variables, they are from the consumption module. Examples are: TC (total consumption), TX (total end-use consumption), RC (residential consumption), CC (commercial consumption), IC (industrial consumption), AC (transportation consumption), and EI (electric power sector consumption). Variables related to consumption adjustments are listed from page 140 onwards.

Table A1. Price and Expenditure Variables

MSN	Description	Unit	Formula
ARICD	Asphalt and road oil price in the industrial sector.	Dollars per million Btu	ARICDZZ is independent. ARICDUS = ARICVUS / ARICBUS * 1000
ARICV	Asphalt and road oil expenditures in the industrial sector.	Million dollars	ARICVZZ = ARICBZZ * ARICDZZ / 1000 ARICVUS = ΣARICVZZ
ARTCD	Asphalt and road oil average price, all sectors.	Dollars per million Btu	ARTCD = ARICD
ARTCV	Asphalt and road oil total expenditures.	Million dollars	ARTCV = ARICV
ARTXD	Asphalt and road oil average price, all end-use sectors.	Dollars per million Btu	ARTXD = ARTXV / ARTXB * 1000
ARTXV	Asphalt and road oil total end-use expenditures.	Million dollars	ARTXV = ARICV
AVACD	Aviation gasoline price in the transportation sector.	Dollars per million Btu	AVACDZZ is independent. AVACDUS = AVACVUS / AVACBUS * 1000
AVACV	Aviation gasoline expenditures in the transportation sector.	Million dollars	AVACVZZ = AVACBZZ * AVACDZZ / 1000 AVACVUS = ΣAVACVZZ
AVTCD	Aviation gasoline average price, all sectors.	Dollars per million Btu	AVTCD = AVACD
AVTCV	Aviation gasoline total expenditures.	Million dollars	AVTCV = AVACV
AVTXD	Aviation gasoline average price, all end-use sectors.	Dollars per million Btu	AVTXD = AVTXV / AVTXB * 1000
AVTXV	Aviation gasoline total end-use expenditures.	Million dollars	AVTXV = AVACV
CCEXD	Coal coke exports average price, United States.	Dollars per million Btu	CCEXDUS is independent.
CCEXV	Coal coke exports expenditures, United States.	Million dollars	CCEXVUS = CCEXBUS * CCEXDUS / 1000
CCIMD	Coal coke imports average price, United States.	Dollars per million Btu	CCIMDUS is independent.
CCIMV	Coal coke imports expenditures, United States.	Million dollars	CCIMVUS = CCIMBUS * CCIMDUS / 1000
CCNIV	Coal coke net imports expenditures, United States.	Million dollars	CCNIVUS = CCIMVUS - CCEXVUS
CLACD	Coal price in the transportation sector.	Dollars per million Btu	CLACDZZ is independent. CLACDUS = CLACVUS / CLACBUS * 1000
CLACV	Coal expenditures in the transportation sector.	Million dollars	CLACVZZ = CLACBZZ * CLACDZZ / 1000 CLACVUS = ΣCLACVZZ
CLCCD	Coal price in the commercial sector.	Dollars per million Btu	CLCCDZZ is independent. CLCCDUS = CLCCVUS / CLCCBUS * 1000
CLCCV	Coal expenditures in the commercial sector.	Million dollars	CLCCVZZ = CLCCBZZ * CLCCDZZ / 1000 CLCCVUS = ΣCLCCVZZ

Table A1. Price and Expenditure Variables (cont.)

MSN	Description	Unit	Formula
CLEID	Coal price in the electric power sector.	Dollars per million Btu	CLEIDZZ is independent. CLEIDUS = CLEIVUS / CLEIBUS * 1000
CLEIV	Coal expenditures in the electric power sector.	Million dollars	CLEIVZZ = CLEIBZZ * CLEIDZZ / 1000 CLEIVUS = ΣCLEIVZZ
CLICD	Coal price in the industrial sector.	Dollars per million Btu	CLICD = CLICV / CLISB * 1000
CLICV	Coal expenditures in the industrial sector.	Million dollars	CLICVZZ = CLKCVZZ + CLOCVZZ CLICVUS = ΣCLICVZZ
CLKCD	Coal price at coke plants.	Dollars per million Btu	CLKCDZZ is independent. CLKCDUS = CLKCVUS / CLKCBUS * 1000
CLKCV	Coal expenditures at coke plants.	Million dollars	CLKCVZZ = CLKCBZZ * CLKCDZZ / 1000 CLKCVUS = ΣCLKCVZZ
CLOCD	Coal price in the industrial sector other than coke plants.	Dollars per million Btu	CLOCDZZ is independent. CLOCDUS = CLOCVUS / CLOSBUS * 1000
CLOCV	Coal expenditures in the industrial sector other than coke plants.	Million dollars	CLOCVZZ = CLOSBZZ * CLOCDZZ / 1000 CLOCVUS = ΣCLOCVZZ
CLRCD	Coal price in the residential sector.	Dollars per million Btu	CLRCDZZ is independent. CLRCDUS = CLRCVUS / CLRCBUS * 1000
CLRCV	Coal expenditures in the residential sector.	Million dollars	CLRCVZZ = CLRCBZZ * CLRCDZZ / 1000 CLRCVUS = ΣCLRCVZZ
CLTCD	Coal average price, all sectors.	Dollars per million Btu	CLTCD = CLTCV / CLSCB * 1000
CLTCV	Coal total expenditures.	Million dollars	CLTCV = CLKCV + CLXCV
CLTXD	Coal average price, all end-use sectors.	Dollars per million Btu	CLTXD = (CLTXV / (CLSCB - CLEIB)) * 1000
CLTXV	Coal total end-use expenditures.	Million dollars	CLTXVZZ = CLACVZZ + CLCCVZZ + CLICVZZ + CLRCVZZ CLTXVUS = ΣCLTXVZZ
CLXCD	Coal average price for all sectors excluding coke plants and refineries.	Dollars per million Btu	CLXCD = CLXCV / CLXCB * 1000
CLXCV	Coal expenditures for all sectors excluding coke plants and refineries.	Million dollars	CLXCVZZ = CLRCVZZ + CLCCVZZ + CLOCVZZ + CLACVZZ + CLEIVZZ CLXCVUS = ΣCLXCVZZ
DFACD	Distillate fuel oil price in the transportation sector.	Dollars per million Btu	DFACDZZ is independent. DFACDUS = DFACVUS / DFACBUS * 1000

Table A1. Price and Expenditure Variables (cont.)

MSN	Description	Unit	Formula
DFACV	Distillate fuel oil expenditures in the transportation sector.	Million dollars	DFACVZZ = DFACBZZ * DFACDZZ / 1000 DFACVUS = ΣDFACVZZ
DFCCD	Distillate fuel oil price in the commercial sector.	Dollars per million Btu	DFCCDZZ is independent. DFCCDUS = DFCCVUS / DFCCBUS * 1000
DFCCV	Distillate fuel oil expenditures in the commercial sector.	Million dollars	DFCCVZZ = DFCCBZZ * DFCCDZZ / 1000 DFCCVUS = ΣDFCCVZZ
DFEID	Distillate fuel oil price in the electric power sector.	Dollars per million Btu	DFEIDZZ is independent. DFEIDUS = DFEIVUS / DFEIBUS * 1000
DFEIV	Distillate fuel oil expenditures in the electric power sector.	Million dollars	DFEIVZZ = DFEIBZZ * DFEIDZZ / 1000 DFEIVUS = ΣDFEIVZZ
DFICD	Distillate fuel oil price in the industrial sector.	Dollars per million Btu	DFICDZZ is independent. DFICDUS = DFICVUS / DFISBUS * 1000
DFICV	Distillate fuel oil expenditures in the industrial sector.	Million dollars	DFICVZZ = DFISBZZ * DFICDZZ / 1000 DFICVUS = ΣDFICVZZ
DFRCD	Distillate fuel oil price in the residential sector.	Dollars per million Btu	DFRCDZZ is independent. DFRCDUS = DFRCVZZ / DFRCBZZ * 1000
DFRCV	Distillate fuel oil expenditures in the residential sector.	Million dollars	DFRCVZZ = DFRCBZZ * DFRCDZZ / 1000 DFRCVUS = ΣDFRCVZZ
DFTCD	Distillate fuel oil average price, all sectors.	Dollars per million Btu	DFTCD = DFTCV / DFSCB * 1000
DFTCV	Distillate fuel oil total expenditures.	Million dollars	DFTCVZZ = DFRCVZZ + DFCCVZZ + DFICVZZ + DFACVZZ + DFEIVZZ DFTCVUS = ΣDFTCVZZ
DFTXD	Distillate fuel oil average price, all end-use sectors.	Dollars per million Btu	DFTXD = (DFTXV / (DFSCB - DFEIB)) * 1000
DFTXV	Distillate fuel oil total end-use expenditures.	Million dollars	DFTXVZZ = DFACVZZ + DFCCVZZ + DFICVZZ + DFRCVZZ DFTXVUS = ΣDFTXVZZ
DKEID	Distillate fuel oil and kerosene-type jet fuel average price in the electric power sector.	Dollars per million Btu	DKEID = DKEIV / DKEIB * 1000
DKEIV	Distillate fuel oil and kerosene-type jet fuel expenditures in the electric power sector.	Million dollars	DKEIVZZ = DFEIVZZ + JFEUVZZ DKEIVUS = ΣDKEIVZZ
ELEXD	Electricity exports average price.	Dollars per million Btu	ELEXD is independent.
ELEXV	Electricity exports expenditures.	Million dollars	ELEXVZZ = ELEXBZZ * ELEXDZZ / 1000 ELEXVUS = ΣELEXVZZ

Table A1. Price and Expenditure Variables (cont.)

MSN	Description	Unit	Formula
ELIMD	Electricity imports average price.	Dollars per million Btu	ELIMD is independent.
ELIMV	Electricity imports expenditures.	Million dollars	ELIMVZZ = ELIMBZZ * ELIMDZZ / 1000 ELIMVUS = ΣELIMVZZ
EMACV	Fuel ethanol, excluding denaturant, expenditures in the transportation sector (compiled for inclusion in total expenditures by end-use sector before 1993).	Million dollars	EMACVZZ = EMACBZZ * MGACDZZ / 1000 EMACVUS = ΣEMACVZZ
EMCCV	Fuel ethanol, excluding denaturant, expenditures in the commercial sector (compiled for inclusion in total expenditires by end use sector before 1993).	Million dollars	EMCCVZZ = EMCCBZZ * MGCCDZZ / 1000 EMCCVUS = ΣEMCCVZZ
EMICV	Fuel ethanol, excluding denaturant, expenditures in the industrial sector (compiled for inclusion in total expenditures by end-use sector before 1993).	Million dollars	EMICVZZ = EMICBZZ * MGACDZZ / 1000 EMICVUS = ΣEMICVZZ
EMTCV	Fuel ethanol, excluding denaturant, total expenditures (compiled for inclusion in total expenditures before 1993).	Million dollars	EMTCVZZ = EMACVZZ + EMCCVZZ + EMICVZZ EMTCVUS = ΣEMTCVZZ
ESACD	Electricity price in the transportation sector.	Dollars per million Btu	ESACDZZ is independent. ESACDUS = ESACVUS / ESACBUS * 1000
ESACV	Electricity expenditures in the transportation sector.	Million dollars	ESACVZZ = ESACBZZ * ESACDZZ / 1000 ESACVUS = ΣESACVZZ
ESCCD	Electricity price in the commercial sector.	Dollars per million Btu	ESCCDZZ is independent. ESCCDUS = ESCCVUS / ESCCBUS * 1000
ESCCV	Electricity expenditures in the commercial sector.	Million dollars	ESCCVZZ = ESCCBZZ * ESCCDZZ / 1000 ESCCVUS = ΣESCCVZZ
ESICD	Electricity price in the industrial sector.	Dollars per million Btu	ESICDZZ is independent. ESICDUS = ESICVUS / ESISBUS * 1000
ESICV	Electricity expenditures in the industrial sector.	Million dollars	ESICVZZ = ESESBZZ * ESICDZZ / 1000 ESICVUS = ΣESICVZZ
ESRCD	Electricity price in the residential sector.	Dollars per million Btu	ESRCDZZ is independent. ESRCDUS = ESRCVUS / ESRCBUS * 1000
ESRCV	Electricity expenditures in the residential sector.	Million dollars	ESRCVZZ = ESRCBZZ * ESRCDZZ / 1000 ESRCVUS = ΣESRCVZZ
ESTCD	Electricity average price, all sectors.	Dollars per million Btu	ESTCD = ESTCV / ESSCB * 1000

Table A1. Price and Expenditure Variables (cont.)

MSN	Description	Unit	Formula
ESTCV	Electricity total expenditures.	Million dollars	ESTCVZZ = ESRCVZZ + ESCCVZZ + ESICVZZ + ESACVZZ ESTCVUS = ΣESTCVZZ
ESTXD	Electricity average price, all end-use sectors.	Dollars per million Btu	ESTXD = ESTXV / ESSCB * 1000
ESTXV	Electricity total end-use expenditures.	Million dollars	ESTXVZZ = ESACVZZ + ESCCVZZ + ESICVZZ + ESRCVZZ ESTXVUS = ΣESTXVZZ
FNICD	Petrochemical feedstocks, naphtha less than 401° F, price in the industrial sector.	Dollars per million Btu	FNICDZZ is independent. FNICDUS = FNICVUS / FNICBUS * 1000
FNICV	Petrochemical feedstocks, naphtha less than 401° F, expenditures in the industrial sector.	Million dollars	FNICVZZ = FNICBZZ * FNICDZZ / 1000 FNICVUS = ΣFNICVZZ
FOICD	Petrochemical feedstocks, other oils equal to or greater than 401° F, price in the industrial sector.	Dollars per million Btu	FOICDZZ is independent. FOICDUS = FOICVUS / FOICBUS * 1000
FOICV	Petrochemical feedstocks, other oils equal to or greater than 401° F, expenditures in industrial sector.	Million dollars	FOICVZZ = FOICBZZ * FOICDZZ / 1000 FOICVUS = ΣFOICVZZ
FSICD	Petrochemical feedstocks, still gas, price in the industrial sector.	Dollars per million Btu	FSICDZZ is independent. FSICDUS = FSICVUS / FSICBUS * 1000
FSICV	Petrochemical feedstocks, still gas, expenditures in the industrial sector.	Million dollars	FSICVZZ = FSICBZZ * FSICDZZ / 1000 FSICVUS = ΣFSICVZZ
GDPRV	Current-dollar gross domestic product.	Million dollars	GDPRV is independent.
JFACD	Jet fuel price in the transportation sector.	Dollars per million Btu	JFACDZZ is independent. JFACDUS = JFACVUS / JFACBUS * 1000
JFACV	Jet fuel expenditures in the transportation sector.	Million dollars	JFACVZZ = JFACBZZ * JFACDZZ / 1000 JFACVUS = ΣJFACVZZ
JFEUD	Jet fuel price in the electric power sector (1972–1982 only).	Dollars per million Btu	JFEUDZZ is independent.
JFEUV	Jet fuel expenditures in the electric power sector (1972–1982 only).	Million dollars	JFEUVZZ = JFEUBZZ * JFEUDZZ / 1000
JFTCD	Jet fuel average price, all sectors.	Dollars per million Btu	JFTCD = JFTCV / JFTCB * 1000
JFTCV	Jet fuel total expenditures.	Million dollars	JFTCVZZ = JFACVZZ + JFEUVZZ JFTCVUS = ΣJFTCVZZ
JFTXD	Jet fuel average price, all end-use sectors.	Dollars per million Btu	JFTXD = JFTXV / JFTXB * 1000

Table A1. Price and Expenditure Variables (cont.)

MSN	Description	Unit	Formula
JFTXV	Jet fuel total end-use expenditures.	Million dollars	JFTXVZZ = JFACVZZ JFTXVUS = ΣJFTXVZZ
KSCCD	Kerosene price in the commercial sector.	Dollars per million Btu	KSCCDZZ is independent. KSCCDUS = KSCCVUS / KSCCBUS * 1000
KSCCV	Kerosene expenditures in the commercial sector.	Million dollars	KSCCVZZ = KSCCBZZ * KSCCDZZ / 1000 KSCCVUS = ΣKSCCVZZ
KSICD	Kerosene price in the industrial sector.	Dollars per million Btu	KSICDZZ = is independent. KSICDUS = KSICVUS / KSICBUS * 1000
KSICV	Kerosene expenditures in the industrial sector.	Million dollars	KSICVZZ = KSICBZZ * KSICDZZ / 1000 KSICVUS = ΣKSICVZZ
KSRCD	Kerosene price in the residential sector.	Dollars per million Btu	KSRCDZZ = is independent. KSRCDUS = KSRCVUS / KSRCBUS * 1000
KSRCV	Kerosene expenditures in the residential sector.	Million dollars	KSRCVZZ = KSRCBZZ * KSRCDZZ / 1000 KSRCVUS = ΣKSRCVZZ
KSTCD	Kerosene average price, all sectors.	Dollars per million Btu	KSTCD = KSTCV / KSTCB * 1000
KSTCV	Kerosene total expenditures.	Million dollars	KSTCVZZ = KSRCVZZ + KSCCVZZ + KSICVZZ KSTCVUS = ΣKSTCVZZ
KSTXD	Kerosene average price, all end-use sectors.	Dollars per million Btu	KSTXD = KSTXV / KSTXB * 1000
KSTXV	Kerosene total end-use expenditures.	Million dollars	KSTXVZZ = KSCCVZZ + KSICVZZ + KSRCVZZ KSTXVUS = ΣKSTXVZZ
LGACD	LPG price in the transportation sector.	Dollars per million Btu	LGACDZZ is independent. LGACDUS = LGACVUS / LGACBUS * 1000
LGACV	LPG expenditures in the transportation sector.	Million dollars	LGACVZZ = LGACBZZ * LGACDZZ / 1000 LGACVUS = ΣLGACVZZ
LGCCD	LPG price in the commercial sector.	Dollars per million Btu	LGCCDZZ is independent. LGCCDUS = LGCCVUS / LGCCBUS * 1000
LGCCV	LPG expenditures in the commercial sector.	Million dollars	LGCCVZZ = LGCCBZZ * LGCCDZZ / 1000 LGCCVUS = ΣLGCCVZZ
LGICD	LPG price in the industrial sector.	Dollars per million Btu	LGICDZZ is independent. LGICDUS = LGICVUS / LGISBUS * 1000
LGICV	LPG expenditures in the industrial sector.	Million dollars	LGICVZZ = LGISBZZ * LGICDZZ / 1000 LGICVUS = ΣLGICVZZ

Table A1. Price and Expenditure Variables (cont.)

MSN	Description	Unit	Formula
LGRCD	LPG price in the residential sector.	Dollars per million Btu	LGRCDZZ is independent. LGRCDUS = LGRCVUS / LGRCBUS * 1000
LGRCV	LPG expenditures in the residential sector.	Million dollars	LGRCVZZ = LGRCBZZ * LGRCDZZ / 1000 LGRCVUS = ΣLGRCVZZ
LGTCD	LPG average price, all sectors.	Dollars per million Btu	LGTCD = LGTCV / LGSCB * 1000
LGTCV	LPG total expenditures.	Million dollars	LGTCVZZ = LGACVZZ + LGCCVZZ + LGICVZZ + LGRCVZZ LGTCVUS = ΣLGTCVZZ
LGTXD	LPG average price, all end-use sectors.	Dollars per million Btu	LGTXD = LGTXV / LGSCB * 1000
LGTXV	LPG total end-use expenditures.	Million dollars	LGTXVZZ = LGACVZZ + LGCCVZZ + LGICVZZ + LGRCVZZ LGTXVUS = ΣLGTXVZZ
LUACD	Lubricants price in the transportation sector.	Dollars per million Btu	LUACDZZ is independent. LUACDUS = LUACVUS / LUACBUS * 1000
LUACV	Lubricants expenditures in the transportation sector.	Million dollars	LUACVZZ = LUACBZZ * LUACDZZ / 1000 LUACVUS = ΣLUACVZZ
LUICD	Lubricants price in the industrial sector.	Dollars per million Btu	LUICDZZ is independent. LUICDUS = LUICVUS / LUICBUS * 1000
LUICV	Lubricants expenditures in the industrial sector.	Million dollars	LUICVZZ = LUICBZZ * LUICDZZ / 1000 LUICVUS = ΣLUICVZZ
LUTCD	Lubricants average price, all sectors.	Dollars per million Btu	LUTCD = LUTCV / LUTCB * 1000
LUTCV	Lubricants average price, all sectors.	Million dollars	LUTCVZZ = LUACVZZ + LUICVZZ LUTCVUS = ΣLUTCVZZ
LUTXD	Lubricants average price, all end-use sectors.	Dollars per million Btu	LUTXD = LUTXV / LUTXB * 1000
LUTXV	Lubricants total end-use expenditures.	Million dollars	LUTXVZZ = LUACVZZ + LUICVZZ LUTXVUS = ΣLUTXVZZ
MGACD	Motor gasoline price in the transportation sector.	Dollars per million Btu	MGACDZZ is independent. MGACDUS = MGACVUS / MGACBUS * 1000
MGACV	Motor gasoline expenditures in the transportation sector.	Million dollars	MGACVZZ = MGACBZZ * MGACDZZ / 1000 MGACVUS = ΣMGACVZZ
MGCCD	Motor gasoline price in the commercial sector.	Dollars per million Btu	MGCCDZZ is independent. MGCCDUS = MGCCVUS / MGCCBUS * 1000
MGCCV	Motor gasoline expenditures in the commercial sector.	Million dollars	MGCCVZZ = MGCCBZZ * MGCCDZZ / 1000 MGCCVUS = ΣMGCCVZZ

Table A1. Price and Expenditure Variables (cont.)

MSN	Description	Unit	Formula
MGICD	Motor gasoline price in the industrial sector.	Dollars per million Btu	MGICDZZ is independent. MGICDUS = MGICVUS / MGICBUS * 1000
MGICV	Motor gasoline expenditures in the industrial sector.	Million dollars	MGICVZZ = MGICBZZ * MGICDZZ / 1000 MGICVUS = ΣMGICVZZ
MGTCD	Motor gasoline average price, all sectors.	Dollars per million Btu	MGTCD = MGTCV / MGTCB * 1000
MGTCV	Motor gasoline total expenditures.	Million dollars	MGTCVZZ = MGACVZZ + MGCCVZZ + MGICVZZ MGTCVUS = ΣMGTCVZZ
MGTPV	Motor gasoline expenditures per capita.	Million dollars	MGTPV = MGTCV / TPOPP * 1000
MGTXD	Motor gasoline average price, all end-use sectors.	Dollars per million Btu	MGTXD = MGTXV / MGTXB * 1000
MGTXV	Motor gasoline total end-use expenditures.	Million dollars	MGTXVZZ = MGACVZZ + MGCCVZZ + MGICVZZ MGTXVUS = ΣMGTXVZZ
MSICD	Miscellaneous petroleum products price in the industrial sector.	Dollars per million Btu	MSICDZZ is independent. MSICDUS = MSICVUS / MSICBUS * 1000
MSICV	Miscellaneous petroleum products expenditures in the industrial sector.	Million dollars	MSICVZZ = MSICBZZ * MSICDZZ / 1000 MSICVUS = ΣMSICVZZ
NGACD	Natural gas price in the transportation sector.	Dollars per million Btu	NGACDZZ is independent. NGACDUS = NGACVUS / NGASBUS * 1000
NGACV	Natural gas expenditures in the transportation sector.	Million dollars	NGACVZZ = NGASBZZ * NGACDZZ / 1000 NGACVUS = ΣNGACVZZ
NGCCD	Natural gas price in the commercial sector (including supplemental gaseous fuels).	Dollars per million Btu	NGCCDZZ is independent. NGCCDUS = NGCCVUS / NGCCBUS * 1000
NGCCV	Natural gas expenditures in the commercial sector (including supplemental gaseous fuels).	Million dollars	NGCCVZZ = NGCCBZZ * NGCCDZZ / 1000 NGCCVUS = ΣNGCCVZZ
NGEID	Natural gas price in the electric power sector (including supplemental gaseous fuels).	Dollars per million Btu	NGEIDZZ is independent. NGEIDUS = NGEIVUS / NGEIBUS * 1000
NGEIV	Natural gas expenditures in the electric power sector (including supplemental gaseous fuels).	Million dollars	NGEIVZZ = NGEIBZZ * NGEIDZZ / 1000 NGEIVUS = ΣNGEIVZZ
NGICD	Natural gas price in the industrial sector (including supplemental gaseous fuels).	Dollars per million Btu	NGICDZZ is independent. NGICDUS = NGICVZZ / NGISBZZ * 1000
NGICV	Natural gas expenditures in the industrial sector (including supplemental gaseous fuels).	Million dollars	NGICVZZ = NGISBZZ * NGICDZZ / 1000 NGICVUS = ΣNGICVZZ

Table A1. Price and Expenditure Variables (cont.)

MSN	Description	Unit	Formula
NGRCD	Natural gas price in the residential sector (including supplemental gaseous fuels).	Dollars per million Btu	NGRCDZZ is independent. NGRCDUS = NGRCVZZ / NGRCBZZ * 1000
NGRCV	Natural gas expenditures in the residential sector (including supplemental gaseous fuels).	Million dollars	NGRCVZZ = NGRCBZZ * NGRCDZZ / 1000 NGRCVUS = ΣNGRCVZZ
NGTCD	Natural gas average price, all sectors (including supplemental gaseous fuels).	Dollars per million Btu	NGTCD = NGTCV / NGSCB * 1000
NGTCV	Natural gas total expenditures (including supplemental gaseous fuels).	Million dollars	NGTCVZZ = NGRCVZZ + NGCCVZZ + NGICVZZ + NGACVZZ + NGEIVZZ NGTCVUS = ΣNGTCVZZ
NGTXD	Natural gas average price, all end-use sectors (including supplemental gaseous fuels).	Dollars per million Btu	NGTXD = (NGTXV / (NGSCB - NGEIB)) * 1000
NGTXV	Natural gas total end-use expenditures (including supplemental gaseous fuels).	Million dollars	NGTXVZZ = NGACVZZ + NGCCVZZ + NGICVZZ + NGRCVZZ NGTXVUS = ΣNGTXVZZ
NUEGD	Nuclear fuel price in the electric power sector.	Dollars per million Btu	NUEGDZZ is independent. NUEGDUS = NUEGVUS / NUEGBUS * 1000
NUEGV	Nuclear fuel expenditures in the electric power sector.	Million dollars	NUEGVZZ = NUEGBZZ * NUEGDZZ / 1000 NUEGVUS = ΣNUEGVZZ
NUETD	Nuclear fuel average price, all sectors.	Dollars per million Btu	NUETD = NUETV / NUETB * 1000
NUETV	Nuclear fuel total expenditures.	Million dollars	NUETVZZ = NUEGVZZ NUETVUS = ΣNUETVZZ
P1ICD	Asphalt and road oil, kerosene, lubricants, and "other petroleum products" average price in the industrial sector.	Dollars per million Btu	P1ICD = P1ICV / P1ISB * 1000
P1ICV	Asphalt and road oil, kerosene, lubricants, and "other petroleum products" expenditures in the industrial sector.	Million dollars	P1ICVZZ = ARICVZZ + KSICVZZ + LUICVZZ + POICVZZ P1ICVUS = ΣP1ICVZZ
P1TCD	Asphalt and road oil, aviation gasoline, kerosene, lubricants, and "other petroleum products" average price, all sectors.	Dollars per million Btu	P1TCD = P1TCV / P1SCB * 1000
P1TCV	Asphalt and road oil, aviation gasoline, kerosene, lubricants, and "other petroleum products" total expenditures.	Million dollars	P1TCVZZ = ARTCVZZ + AVTCVZZ + KSTCVZZ + LUTCVZZ + POTCVZZ P1TCVUS = ΣP1TCVZZ

Table A1. Price and Expenditure Variables (cont.)

MSN	Description	Unit	Formula
P1TXD	Asphalt and road oil, aviation gasoline, kerosene, lubricants, and "other petroleum products" average price, all end-use sectors.	Dollars per million Btu	P1TXD = (P1TXV / (P1SCB - PCEIB)) * 1000
P1TXV	Asphalt and road oil, aviation gasoline, kerosene, lubricants, and "other petroleum products" total end-use expenditures.	Million dollars	P1TXVZZ = P1TCVZZ - PCEIVZZ P1TXVUS = ΣP1TXVZZ
PAACD	All petroleum products average price in the transportation sector.	Dollars per million Btu	PAACD = PAACV / PAACB * 1000
PAACV	All petroleum products total expenditures in the transportation sector.	Million dollars	PAACVZZ = AVACVZZ + DFACVZZ + JFACVZZ + LGACVZZ + LUACVZZ + MGACVZZ + RFACVZZ PAACVUS = ΣPAACVZZ
PACCD	All petroleum products average price in the commercial sector.	Dollars per million Btu	PACCD = PACCV / PACCB * 1000
PACCV	All petroleum products total expenditures in the commercial sector.	Million dollars	PACCVZZ = DFCCVZZ + KSCCVZZ + LGCCVZZ + MGCCVZZ + PCCCVZZ + RFCCVZZ PACCVUS = ΣPACCVZZ
PAEID	All petroleum products average price in the electric power sector.	Dollars per million Btu	PAEID = PAEIV / PAEIB * 1000
PAEIV	All petroleum products total expenditures in the electric power sector.	Million dollars	PAEIVZZ = DKEIVZZ + PCEIVZZ + RFEIVZZ PAEIVUS = ΣPAEIVZZ
PAICD	All petroleum products average price in the industrial sector.	Dollars per million Btu	PAICD = PAICV / PAISB * 1000
PAICV	All petroleum products total expenditures in the industrial sector.	Million dollars	PAICVZZ = ARICVZZ + DFICVZZ + KSICVZZ + LGICVZZ + LUICVZZ + MGICVZZ + RFICVZZ + POICVZZ PAICVUS = ΣPAICVZZ
PARCD	All petroleum products average price in the residential sector.	Dollars per million Btu	PARCD = PARCV / PARCB * 1000
PARCV	All petroleum products total expenditures in the residential sector.	Million dollars	PARCVZZ = DFRCVZZ + KSRCVZZ + LGRCVZZ PARCVUS = ΣPARCVZZ
PATCD	All petroleum products average price, all sectors.	Dollars per million Btu	PATCD = PATCV / PASCB * 1000
PATCV	All petroleum products total expenditures.	Million dollars	PATCVZZ = ARTCVZZ + AVTCVZZ + DFTCVZZ + JFTCVZZ + KSTCVZZ + LGTCVZZ + LUTCVZZ + MGTCVZZ + RFTCVZZ + POTCVZZ PATCVUS = ΣPATCVZZ

Table A1. Price and Expenditure Variables (cont.)

MSN	Description	Unit	Formula
PATXD	All petroleum products average price, all end-use sectors.	Dollars per million Btu	PATXD = (PATXV / (PASCB - PAEIB)) * 1000
PATXV	All petroleum products total end-use expenditures.	Million dollars	PATXVZZ = ARTXVZZ + AVTXVZZ + DFTXVZZ + JFTXVZZ + KSTXVZZ + LGTXVZZ + LUTXVZZ + MGTXVZZ + POTXVZZ + RFTXVZZ PATXVUS = ΣPATXVZZ
PCCCD	Petroleum coke price in the commercial sector.	Dollars per million Btu	PCCCDZZ is independent. PCCCDUS = PCCCVUS / PCCCBUS * 1000
PCCCV	Petroleum coke expenditures in the commercial sector.	Million dollars	PCCCVZZ = PCCCBZZ * PCCCDZZ / 1000 PCCCVUS = ΣPCCCVZZ
PCEID	Petroleum coke price in the electric power sector.	Dollars per million Btu	PCEIDZZ is independent. PCEIDUS = PCEIVUS / PCEIBUS * 1000
PCEIV	Petroleum coke expenditures in the electric power sector.	Million dollars	PCEIVZZ = PCEIBZZ * PCEIDZZ / 1000 PCEIVUS = ΣPCEIVZZ
PCI3D	Price of petroleum coke consumed by the industrial CHP and electricity-only plants.	Dollars per million Btu	PCI3DZZ is independent. PCI3DUS = PCI3VUS / PCI3BUS * 1000
PCI3V	Expenditures of petroleum coke consumed by the industrial CHP and electricity-only plants.	Million dollars	PCI3VZZ = PCI3BZZ * PCI3DZZ / 1000 PCI3VUS = ΣPCI3VZZ
PCICD	Petroleum coke price in the industrial sector.	Dollars per million Btu	PCICD = PCICV / PCISB * 1000
PCICV	Petroleum coke expenditures in the industrial sector.	Million dollars	PCICVZZ = PCI3VZZ + PCOCVZZ PCICVUS = ΣPCICVZZ
PCOCD	Petroleum coke price in the industrial sector other than for refinery use and CHP.	Dollars per million Btu	PCOCDZZ is independent. PCOCDUS = PCOCVUS / PCOCBUS * 1000
PCOCV	Petroleum coke expenditures in the industrial sector other than for refinery use and CHP.	Million dollars	PCOCVZZ = PCOCBZZ * PCOCDZZ / 1000 PCOCVUS = ΣPCOCVZZ
PCTCD	Petroleum coke average price, all sectors.	Dollars per million Btu	PCTCD = PCTCV / PCSCB * 1000
PCTCV	Petroleum coke total expenditures.	Million dollars	PCTCVZZ = PCCCVZZ + PCICVZZ + PCEIVZZ PCTCVUS = ΣPCTCVZZ
PEACD	Primary energy average price in the transportation sector.	Dollars per million Btu	PEACD = PEACV / PEASB * 1000
PEACV	Primary energy total expenditures in the transportation sector.	Million dollars	PEACVZZ = CLACVZZ + NGACVZZ + PAACVZZ PEACVUS = ΣPEACVZZ

Table A1. Price and Expenditure Variables (cont.)

MSN	Description	Unit	Formula
PECCD	Primary energy average price in the commercial sector.	Dollars per million Btu	PECCD = PECCV / PECSB * 1000
PECCV	Primary energy total expenditures in the commercial sector.	Million dollars	PECCVZZ = CLCCVZZ + NGCCVZZ + PACCVZZ + WWCCVZZ PECCVUS = ΣPECCVZZ
PEEID	Primary energy average price in the electric power sector.	Dollars per million Btu	PEEID = PEEIV / PEEIB * 1000
PEEIV	Primary energy total expenditures in the electric power sector.	Million dollars	PEEIVZZ = CLEIVZZ + NGEIVZZ + PAEIVZZ + NUEGVZZ + WWEIVZZ + ELIMVZZ PEEIVUS = ΣPEEIVZZ
PEICD	Primary energy average price in the industrial sector.	Dollars per million Btu	PEICD = PEICV / PEISB * 1000
PEICV	Primary energy total expenditures in the industrial sector.	Million dollars	PEICVZZ = CLICVZZ + NGICVZZ + PAICVZZ + WWICVZZ PEICVUS = ΣPEICVZZ + CCNIVUS
PERCV	Primary energy total expenditures in the residential sector.	Million dollars	PERCVZZ = CLRCVZZ + NGRCVZZ + PARCVZZ + WDRCVZZ PERCVUS = ΣPERCVZZ
PESSD	Primary energy average price, all end-use sectors.	Dollars per million Btu	PESSD = PESSV / PESSB * 1000
PESSV	Primary energy total end-use expenditures.	Million dollars	PESSVZZ = PERCVZZ + PECCVZZ + PEICVZZ + PEACVZZ PESSVUS = ΣPESSVZZ + CCNIVUS
PETCD	Primary energy average price, all sectors.	Dollars per million Btu	PETCD = PETCV / PESCB * 1000
PETCV	Primary energy total expenditures.	Million dollars	PETCVZZ = PESSVZZ + PEEIVZZ PETCVUS = ΣPETCVZZ + CCNIVUS
PETXD	Primary energy average price, all end-use sectors.	Dollars per million Btu	PETXD = (PETXV / (PESCB - PEEIB)) * 1000
PETXV	Primary energy total end-use expenditures.	Million dollars	PETXVZZ = PEACVZZ + PECCVZZ + PEICVZZ + PERCVZZ PETXVUS = ΣPETXVZZ + CCIMVUS - CCEXVUS
POICD	Other petroleum products average price in the industrial sector.	Dollars per million Btu	POICD = POICV / POISB * 1000
POICV	Other petroleum products total expenditures in the industrial sector.	Million dollars	POICVZZ = FNICVZZ + FOICVZZ + FSICVZZ + MSICVZZ + PCICVZZ + SNICVZZ + WXICVZZ POICVUS = ΣPOICVZZ
POTCD	Other petroleum products average price, all end-use sectors.	Dollars per million Btu	POTCD = POTCV / POSCB * 1000

Table A1. Price and Expenditure Variables (cont.)

MSN	Description	Unit	Formula
POTCV	Other petroleum products total expenditures.	Million dollars	POTCVZZ = PCCCVZZ + PCEIVZZ + POICVZZ POTCVUS = ΣPOTCVZZ
POTXD	Other petroleum products average price, all end-use sectors.	Dollars per million Btu	POTXD = (POTXV / (POSCB - PCEIB)) * 1000
POTXV	Other petroleum products total end-use expenditures.	Million dollars	POTXVZZ = PCCCVZZ + POICVZZ POTXVUS = ΣPOTXVZZ
RFACD	Residual fuel oil price in the transportation sector.	Dollars per million Btu	RFACDZZ is independent. RFACDUS = RFACVUS / RFACBUS * 1000
RFACV	Residual fuel oil expenditures in the transportation sector.	Million dollars	RFACVZZ = RFACBZZ * RFACDZZ / 1000 RFACVUS = ΣRFACVZZ
RFCCD	Residual fuel oil price in the commercial sector.	Dollars per million Btu	RFCCDZZ is independent. RFCCDUS = RFCCVUS / RFCCBUS * 1000
RFCCV	Residual fuel oil expenditures in the commercial sector.	Million dollars	RFCCVZZ = RFCCBZZ * RFCCDZZ / 1000 RFCCVUS = ΣRFCCVZZ
RFEID	Residual fuel oil price in the electric power sector.	Dollars per million Btu	RFEIDZZ is independent. RFEIDUS = RFEIVUS / RFEIBUS * 1000
RFEIV	Residual fuel oil expenditures in the electric power sector.	Million dollars	RFEIVZZ = RFEIBZZ * RFEIDZZ / 1000 RFEIVUS = ΣRFEIVZZ
RFICD	Residual fuel oil price in the industrial sector.	Dollars per million Btu	RFICDZZ is independent. RFICDUS = RFICVUS / RFISBUS * 1000
RFICV	Residual fuel oil expenditures in the industrial sector.	Million dollars	RFICVZZ = RFISBZZ * RFICDZZ / 1000 RFICVUS = ΣRFICVZZ
RFTCD	Residual fuel oil average price, all sectors.	Dollars per million Btu	RFTCD = RFTCV / RFSCB * 1000
RFTCV	Residual fuel oil total expenditures.	Million dollars	RFTCVZZ = RFCCVZZ + RFICVZZ + RFACVZZ + RFEIVZZ RFTCVUS = ΣRFTCVZZ
RFTXD	Residual fuel oil average price, all end-use sectors.	Dollars per million Btu	RFTXD = (RFTXV / (RFSCB - RFEIB)) * 1000
RFTXV	Residual fuel oil total end-use consumption.	Million dollars	RFTXVZZ = RFACVZZ + RFCCVZZ + RFICVZZ RFTXVUS = ΣRFTXVZZ
SNICD	Special naphthas price in the industrial sector.	Dollars per million Btu	SNICDZZ is independent. SNICDUS = SNICVUS / SNICBUS * 1000
SNICV	Special naphthas expenditures in the industrial sector.	Million dollars	SNICVZZ = SNICBZZ * SNICDZZ / 1000 SNICVUS = ΣSNICVZZ

Table A1. Price and Expenditure Variables (cont.)

MSN	Description	Unit	Formula
TEACD	Total energy average price in the transportation.	Dollars per million Btu	TEACD = TEACV / TNASB * 1000
TEACV	Total energy expenditures in the transportation sector.	Million dollars	TEACVZZ = PEACVZZ + ESACVZZ TEACVUS = ΣTEACVZZ
TECCD	Total energy average price in the commercial sector.	Dollars per million Btu	TECCD = TECCV / TNCSB * 1000
TECCV	Total energy expenditures in the commercial sector.	Million dollars	TECCVZZ = PECCVZZ + ESCCVZZ TECCVUS = ΣTECCVZZ
TEGDS	Energy expenditures as percent of current-dollar GDP.	Percent	TEGDS = TETCV / GDPRV * 100
TEICD	Total energy average price in the industrial sector.	Dollars per million Btu	TEICD = TEICV / TNISB * 1000
TEICV	Total energy expenditures in the industrial sector.	Million dollars	TEICVZZ = PEICVZZ + ESICVZZ TEICVUS = ΣTEICVZZ + CCNIVUS
TERCD	Total energy average price in the residential sector.	Dollars per million Btu	TERCD = TERCV / TNRSB * 1000
TERCV	Total energy total expenditures in the residential sector.	Million dollars	TERCVZZ = PERCVZZ + ESRCVZZ TERCVUS = ΣTERCVZZ
TETCD	Total energy average price.	Dollars per million Btu	TETCD = TETCV / TNSCB * 1000
TETCV	Total energy total expenditures.	Million dollars	TETCV = PESSV + ESTCV
TETPV	Total energy expenditures per capita.	Dollars	TETPV = TETCV / TPOPP * 1000
TETXD	Total end-use energy average price.	Dollars per million Btu	TETXD = TETXV / TNSCB * 1000
TETXV	Total end-use energy expenditures.	Million dollars	TETXVZZ = TEACVZZ + TECCVZZ + TEICVZZ + TERCVZZ TETXVUS = ΣTETXVZZ
WDC3D	Wood price, commercial CHP and electricity-only plants, U.S. only.	Dollars per million Btu	WDC3DUS = WDC3VUS / WDCYBUS * 1000
WDC3V	Wood expenditures, commercial CHP and electricity-only plants.	Million dollars	WDC3VZZ = WDCYBZZ * WDEIDUS / 1000 WDC3VUS = ΣWDC3VZZ
WDC4D	Wood price, commercial sector other than CHP and electricity-only plants.	Dollars per million Btu	WDC4D is independent.
WDC4V	Wood expenditures, commercial sector other than CHP and electricity-only plants.	Million dollars	WDC4VZZ = WDCVBZZ * WDC4DZZ / 1000 WDC4VUS = ΣWDC4VZZ
WDEID	Wood price in the electric power sector, U.S. only.	Dollars per million Btu	WDEIDUS is independent.

Table A1. Price and Expenditure Variables (cont.)

MSN	Description	Unit	Formula
WDI3D	Wood price, industrial CHP and electricity-only plants, U.S. only.	Dollars per million Btu	WDI3DUS = WDI3VUS / WDIYBUS * 1000
WDI3V	Wood expenditures, industrial CHP and electricity-only plants.	Million dollars	WDI3VZZ = WDIYBZZ * WDEIDUS / 1000 WDI3VUS = ΣWDI3VZZ
WDRCD	Wood price in the residential sector.	Dollars per million Btu	WDRCDZZ is independent. WDRCDUS = WDRCVUS / WDRSBUS * 1000
WDRCV	Wood expenditures in the residential sector.	Million dollars	WDRCVZZ = WDRSBZZ * WDRCDZZ / 1000 WDRCVUS = ΣWDRCVZZ
WSC3D	Waste price, commercial CHP and electricity-only plants, U.S. only.	Dollars per million Btu	WSC3DUS = WSC3VUS / WSCYBUS * 1000
WSC3V	Waste expenditures, commercial CHP and electricity-only plants.	Million dollars	WSC3VZZ = WSCYBZZ * WSEIDUS /1000 WSC3VUS = ΣWSC3VZZ
WSEID	Waste price in the electric power sector, U.S. only.	Dollars per million Btu	WSEIDUS is independent.
WSI3D	Waste price, industrial CHP and electricity-only plants, U.S. only.	Dollars per million Btu	WSI3DUS = WSI3VUS / WSIYBUS * 1000
WSI3V	Waste expenditures, industrial CHP and electricity-only plants.	Million dollars	WSI3VZZ = WSIYBZZ * WSEIDUS /1000 WSI3VUS = ΣWSI3VZZ
WWCCD	Wood and waste price in the commercial sector.	Dollars per million Btu	WWCCD = WWCCV / WWCSB * 1000
WWCCV	Wood and waste expenditures in the commercial sector.	Million dollars	WWCCVZZ = WDC3VZZ + WDC4VZZ + WSC3VZZ WWCCVUS = ΣWWCCVZZ
WWEID	Wood and waste price in the electric power sector.	Dollars per million Btu	WWEIDZZ is independent. WWEIDUS = WWEIVUS / WWEIBUS * 1000
WWEIV	Wood and waste expenditures in the electric power sector.	Million dollars	WWEIVZZ = WWEIBZZ * WWEIDZZ / 1000 WWEIVUS = ΣWWEIVZZ
WWI4D	Wood and waste prices in the industrial sector other than CHP and electricity-only plants.	Dollars per million Btu	WWI4DZZ is independent. WWI4DUS = WWI4VUS / WWIVBUS
WWI4V	Wood and waste expenditures in the industrial sector other than CHP and electricity-only plants.	Million dollars	WWI4VZZ = WWIVBZZ * WWI4DZZ / 1000 WWI4VUS = ΣWWI4VZZ
WWICD	Wood and waste price in the industrial sector.	Dollars per million Btu	WWICD = WWICV / WWISB * 1000
WWICV	Wood and waste expenditures in the industrial sector.	Million dollars	WWICVZZ = WWI4VZZ + WDI3VZZ + WSI3VZZ WWICVUS = ΣWWICVZZ

Table A1. Price and Expenditure Variables (cont.)

MSN	Description	Unit	Formula
WWSSV	Wood and waste total end-use expenditures.	Million dollars	WWSSVZZ = WDRCVZZ + WWCCVZZ + WWICVZZ WWSSVUS = ΣWWSSVZZ
WWTCD	Wood and waste average price, all sectors.	Dollars per million Btu	WWTCD = WWTCV / WWSCB * 1000
WWTCV	Wood and waste total expenditures.	Million dollars	WWTCVZZ = WWSSVZZ + WWEIVZZ WWTCVUS = ΣWWTCVZZ
WWTXD	Wood and waste average price, all end-use sectors.	Dollars per million Btu	WWTXD = WWTXV / WWSSB * 1000
WWTXV	Wood and waste total end-use expenditures.	Million dollars	WWTXVZZ = WDRCVZZ + WWCCVZZ + WWICVZZ WWTXVUS = ΣWWTXVZZ
WXICD	Waxes price in the industrial sector.	Dollars per million Btu	WXICDZZ is independent. WXICDUS = WXICVUS / WXICBUS * 1000
WXICV	Waxes expenditures in the industrial sector.	Million dollars	WXICVZZ = WXICBZZ * WXICDZZ / 1000 WXICVUS = ΣWXICVZZ

Table A2. Consumption Adjustment Variables

MSN	Description	Unit	Formula
CLISB	Coal consumed by the industrial sector excluding refinery fuel.	Billion Btu	CLISB = CLOSB + CLKCB
CLOCB	Coal consumed by industrial users other than coke plants.	Billion Btu	SEDS consumption variable
CLOCK	Factor for converting coal consumed by industrial users other than coke plants from physical units to Btu.	Million Btu per short ton	SEDS consumption variable
CLOSB	Coal consumed by the industrial sector other than coke plants excluding refinery fuel.	Billion Btu	CLOSB = CLOCB - CLRFB
CLRFB	Coal consumed as refinery fuel.	Billion Btu	CLRFBZZ = CLRFPZZ * CLOCKZZ
CLRFP	Coal consumed as refinery fuel.	Thousand short tons	CLRFPZZ is independent.
CLSCB	Coal total consumption adjusted for process fuel.	Billion Btu	CLSCB = CLRCB + CLCCB + CLISB + CLACB + CLEIB
CLXCB	Coal consumed by all sectors excluding coke plants and refineries.	Billion Btu	CLXCB = CLRCB + CLCCB + CLOSB + CLACB + CLEIB
DFISB	Distillate fuel oil consumed by the industrial sector excluding refinery fuel.	Billion Btu	DFISB = DFICB - DFRFB
DFRFB	Distillate fuel oil consumed as refinery fuel.	Billion Btu	DFRFBZZ = DFRFPZZ * DFTCKUS
DFRFP	Distillate fuel oil consumed as refinery fuel.	Thousand barrels	DFRFPZZ is independent.
DFSCB	Distillate fuel oil total consumption adjusted for process fuel.	Billion Btu	DFSCB = DFRCB + DFCCB + DFISB + DFACB + DFEIB
EMLCB	Energy losses and co-products from the production of fuel ethanol.	Billion Btu	SEDS consumption variable
ESISB	Electricity sales to the industrial sector excluding refinery use.	Billion Btu	ESISB = ESICB - ESRFB
ESRFB	Electricity consumed by refineries.	Billion Btu	ESRFBZZ = ESRFPZZ * 3.412
ESRFP	Electricity consumed by refineries.	Million kilowatthours	ESRFPZZ is independent.
ESSCB	Electricity total consumption adjusted for process fuel.	Billion Btu	ESSCB = ESRCB + ESCCB + ESISB + ESACB
LGISB	LPG consumed by the industrial sector excluding refinery fuel.	Billion Btu	LGISB = LGICB - LGRFB
LGRFB	LPG consumed as refinery fuel.	Billion Btu	LGRFBZZ = LGRFPZZ * LGICKUS

Table A2. Consumption Adjustment Variables (cont.)

MSN	Description	Unit	Formula
LGRFP	LPG consumed as refinery fuel.	Thousand barrels	LGRFPZZ is independent.
LGSCB	LPG total consumption adjusted for process fuel.	Billion Btu	LGSCB = LGRCB + LGCCB + LGISB + LGACB
NGASB	Natural gas consumed by the transportation sector adjusted for process fuel.	Billion Btu	NGASB = NGACB - NGPZB
NGISB	Natural gas consumed by the industrial sector excluding refinery fuel and lease and plant fuels (including supplemental gaseous fuels).	Billion Btu	NGISB = NGICB - NGRFB - NGLPB
NGLPB	Natural gas consumed as lease and plant fuel.	Billion Btu	SEDS consumption variable
NGPZB	Natural gas consumed as pipeline fuel.	Billion Btu	SEDS consumption variable
NGRFB	Natural gas consumed as refinery fuel (including supplemental gaseous fuels).	Billion Btu	NGRFBZZ = NGRFPZZ * NGTXKZZ
NGRFP	Natural gas consumed as refinery fuel (including supplemental gaseous fuels).	Million cubic feet	NGRFPZZ is independent.
NGSCB	Natural gas total consumption adjusted for process fuel.	Billion Btu	NGSCB = NGRCB + NGCCB + NGISB + NGASB + NGEIB
NGTXK	Factor for converting natural gas consumed by all sectors other than electric power from physical units to Btu.	Thousand Btu per cubic foot	SEDS consumption variable
P1ISB	Asphalt and roal oil, kerosene, lubricants, and other petroleum products consumed by the industrial sector excluding refinery fuel and intermediate products.	Billion Btu	P1ISB = ARICB + KSICB + LUICB + POISB
P1SCB	Asphalt and roal oil, kerosene, lubricants, and other petroleum products total consumption adjusted for process fuel and intermediate products.	Billion Btu	P1SCB = ARTCB + AVTCB + KSTCB + LUTCB + POSCB
P5RFB	Other petroleum products consumed as refinery fuel and intermediate products.	Billion Btu	P5RFB = ABICB + MBICB + NAICB + PCRFB + PLICB + PPICB + SGICB + UOICB + USICB
PAISB	All petroleum products consumed by the industrial sector excluding process fuel and intermediate products.	Billion Btu	PAISB = ARICB + DFISB + KSICB + LGISB + LUICB + MGICB + RFISB + POISB
PASCB	All petroleum products total consumption adjusted for process fuel and intermediate products.	Billion Btu	PASCB = ARTCB + AVTCB + DFSCB + JFTCB + KSTCB + LGSCB + LUTCB + MGTCB + RFSCB + POSCB

Table A2. Consumption Adjustment Variables (cont.)

MSN	Description	Unit	Formula
PCISB	Petroleum coke consumed by the industrial sector excluding refinery fuel.	Billion Btu	PCISB = PCICB - PCRFB
PCRFB	Petroleum coke consumed as refinery fuel.	Billion Btu	SEDS consumption variable
PCSCB	Petroleum coke total consumption adjusted for process fuel.	Billion Btu	PCSCB = PCCCB + PCISB + PCEIB
PEASB	Primary energy consumed by the transportation sector, adjusted for process fuel, intermediate products, and fuels with no direct cost.	Billion Btu	PEASB = CLACB + NGASB + PAACB
PECSB	Primary energy consumed by the commercial sector, adjusted for process fuel, intermediate products, and fuels with no direct cost.	Billion Btu	PECSB = CLCCB + NGCCB + PACCB + WWCSB
PEISB	Primary energy consumed by the industrial sector, adjusted for process fuel, intermediate products, and fuels with no direct cost.	Billion Btu	PEISB = CLISB + NGISB + PAISB + WWISB
PERSB	Primary energy consumed by the residential sector, adjusted for process fuel, intermediate products, and fuels with no direct cost.	Billion Btu	PERSB = CLRCB + NGRCB + PARCB + WDRSB
PESCB	Primary energy total consumption, adjusted for process fuel, intermediate products, and fuels with no direct cost.	Billion Btu	PESCB = PESSB + PEEIB
PESSB	Primary energy total end-use consumption, adjusted for process fuel, intermediate products, and fuels with no direct cost.	Billion Btu	PESSB = PERSB + PECSB + PEISB + PEASB
POISB	Other petroleum products consumed by the industrial sector excluding refinery fuel and intermediate products.	Billion Btu	POISB = FNICB + FOICB + FSICB + MSICB + PCISB + SNICB + WXICB
POSCB	Other petroleum products total consumption adjusted for refinery fuel and intermediate products.	Billion Btu	POSCB = PCCCB + PCEIB + POISB
RFISB	Residual fuel oil consumed by the industrial sector excluding refinery fuel.	Billion Btu	RFISB = RFICB - RFRFB
RFRFB	Residual fuel oil consumed as refinery fuel.	Billion Btu	RFRFBZZ = RFRFPZZ * 6.287
RFRFP	Residuial fuel oil consumed as refinery fuel.	Thousand barrels	RFRFPZZ is independent.

Table A2. Consumption Adjustment Variables (cont.)

MSN	Description	Unit	Formula
RFSCB	Residential fuel oil total consumption excluding process fuel.	Billion Btu	RFSCB = RFCCB + RFISB + RFACB + RFEIB
SFINB	Supplemental gaseous fuels consumed by the industrial sector.	Billion Btu	SEDS consumption variable
SOHCB	Photovoltaic and solar thermal energy consumed in the residential, commercial, and industrial sectors (excluding power generated at commercial and industrial facilities with capacity of 1 megawatt or greater).	Billion Btu	SEDS consumption variable
TEPFB	Total energy used as process fuel and other consumption that has no direct fuel costs.	Billion Btu	TEPFB = COICB + EMLCB + GECCB + GEICB + GERCB + HYCCB + HYICB + LOTCB + NGLPB + NGPZB + SOCCB + SOHCB + SOICB + TERFB + WDRXB + WWCXB + WWIXB + WYCCB + WYICB
TERFB	Total energy used as refinery fuel and intermediate products.	Billion Btu	TERFB = CLRFB + DFRFB + ESRFB + LGRFB + NGRFB + P5RFB + RFRFB
TNASB	Total net energy consumed by the transportation sector, adjusted for process fuel, intermediate products, and fuels with no direct cost.	Billion Btu	TNASB = PEASB + ESACB
TNCSB	Total net energy consumed by the commercial sector, adjusted for process fuel, intermediate products, and fuels with no direct cost.	Billion Btu	TNCSB = PECSB + ESCCB
TNISB	Total net energy consumed by the industrial sector, adjusted for process fuel, intermediate products, and fuels with no direct cost.	Billion Btu	TNISB = PEISB + ESISB
TNRSB	Total net energy consumed by the residential sector, adjusted for process fuel, intermediate products, and fuels with no direct cost.	Billion Btu	TNRSB = PERSB + ESRCB
TNSCB	Total net energy consumption, adjusted for process fuel, intermediate products, and fuels with no direct cost.	Billion Btu	TNSCB = PESSB + ESSCB
WDCUB	Wood consumed by the commercial sector other than CHP and electricity-only plants, at no cost.	Billion Btu	WDCUB = WDC4B - WDCVB
WDCVB	Wood consumed by the commercial sector other than CHP and electricity-only plants, costed.	Billion Btu	WDCVBZZ = WDC4BZZ * WDPHSZZ WDCVBUS = ΣWDCVBZZ

Table A2. Consumption Adjustment Variables (cont.)

MSN	Description	Unit	Formula
WDCYB	Wood consumed by commercial CHP and electricity-only plants, costed.	Billion Btu	WDCYBZZ = WDC3BZZ * WDEISUS WDCYBUS = ΣWDCYBZZ
WDCZB	Wood consumed by commercial CHP and electricity-only plants, at no cost.	Billion Btu	WDCZB = WDC3B - WDCYB
WDEIS	Purchased wood as a percentage of all wood consumed by the electric power sector, U.S. only.	Percent	WDEISUS is independent.
WDIYB	Wood consumed by industrial CHP and electricity-only plants, costed.	Billion Btu	WDIYBZZ = WDI3BZZ * WDEISUS WDIYBUS = ΣWDIYBZZ
WDIZB	Wood consumed by industrial CHP and electricity-only plants, at no cost.	Billion Btu	WDIZB = WDI3B - WDIYB
WDPHS	Purchased wood as a percentage of all wood consumed by the residential sector.	Percent	WDPHS is independent.
WDRSB	Wood consumed by the residential sector, costed.	Billion Btu	WDRSBZZ = WDRCBZZ * WDPHSZZ WDRSBUS = ΣWDRSBZZ
WDRXB	Wood consumed by the residential sector, at no cost.	Billion Btu	WDRXB = WDRCB - WDRSB
WSCYB	Waste consumed by commercial CHP and electricity-only plants, costed.	Billion Btu	WSCYBZZ = WSC3BZZ * WSEISUS WSCYBUS = ΣWSCYBZZ
WSCZB	Waste consumed by commercial CHP and electricity-only plants, at no cost.	Billion Btu	WSCZB = WSC3B - WSCYB
WSEIS	Purchased waste as a percentage of all waste consumed by the electric power sector, U.S. only.	Percent	WSEISUS is independent.
WSIYB	Waste consumed by industrial CHP and electricity-only plants, costed.	Billion Btu	WSIYBZZ = WSI3BZZ * WSEISUS WSIYBUS = ΣWSIYBZZ
WSIZB	Waste consumed by industrial CHP and electricity-only plants, at no cost.	Billion Btu	WSIZB = WSI3B - WSIYB
WWCSB	Wood and waste consumed by the commercial sector, costed.	Billion Btu	WWCSB = WDCVB + WDCYB + WSCYB
WWCXB	Wood and waste consumed by the commercial sector, at no cost.	Billion Btu	WWCXB = WDCUB + WDCZB + WSCZB
WWISB	Wood and waste consumed by the industrial sector, costed.	Billion Btu	WWISB = WWIVB + WDIYB + WSIYB

Table A2. Consumption Adjustment Variables (cont.)

MSN	Description	Unit	Formula
WWIXB	Wood and waste consumed by the industrial sector, at no cost.	Billion Btu	WWIXB = WWIUB + WDIZB + WSIZB
WWIUB	Wood and waste consumed by the industrial sector other than CHP and electricity-only plants, at no cost.	Billion Btu	WWIUB = WWI4B - WWIVB
WWIVB	Wood and waste consumed by the industrial sector other than CHP and electricity-only plants, costed.	Billion Btu	WWIVB is independent.
WWSCB	Wood and waste total consumption, adjusted for fuels with no direct cost.	Billion Btu	WWSCB = WWSSB + WWEIB
WWSSB	Wood and waste consumed by the end-use sectors, costed.	Billion Btu	WWSSB = WDRSB + WWCSB + WWISB

Appendix B. Current-Dollar Gross Domestic Product by State

The current-dollar gross domestic product (GDP) data used in the U.S. Energy Information Administration State Energy Data System (SEDS) to calculate total energy consumed per current dollar of output are shown in Tables B1 and B2. The data are the U.S. Department of Commerce, Bureau of Economic Analysis, current-dollar GDP estimates by state, beginning in 1997. The estimates are released June of each year.

For the United States, the national current-dollar GDP series from the National Income and Product Accounts is used instead of the United States series in the Regional Economic Accounts, the source of the state GDP dataset. Due to slight differences in coverage and different sources and vintages of data used to estimate the national GDP and state GDP, the U.S. GDP and the state GDP in SEDS are not strictly compatible. For details, see BEA Regional Economic Accounts: Methodologies, http://bea.gov/regional/methods.cfm.

Additional notes

BEA makes comprehensive revisions every few years, and the state GDP series are usually revised a year after the national GDP series are revised. If the state GDP series are updated in SEDS in the interim period, the pre-revision national GDP series are adopted to maintain comparability.

For 1997 forward, BEA reports current-dollar GDP by state based on the North American Industry Classification System (NAICS). Prior to 1997, the data were based on the Standard Industrial Classification (SIC). In 2014, BEA completed a comprehensive revision of the state GDP and revised the data for 1997 forward. Because of the incompatibility between the two sets of data, state GDP data before 1997 were removed from SEDS.

Data sources

GDPRVUS — Current-dollar gross domestic product of the United States in millions of dollars.

- 1997 forward: U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Products Accounts, http://www.bea.gov/national/xls/gdplev.xls.

GDPRVZZ — Current-dollar gross domestic product by state in millions of dollars.

- 1997 forward: U.S. Department of Commerce, Bureau of Economic Analysis, http://www.bea.gov/iTable/iTable.cfm?ReqID=70&step=1, select Gross Domestic Product by State, GDP in current dollars, NAICS classification, all industry total, and all areas.

Table B1. Current-Dollar Gross Domestic Product by State, 1997-2006

(Billion Dollars)

State	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Alabama	104.3	109.8	115.7	120.4	124.9	130.2	136.3	148.8	157.9	165.1
Alaska	25.8	24.1	24.7	26.9	28.9	29.8	32.1	35.5	40.3	44.9
Arizona	132.8	143.5	156.1	166.1	172.6	179.9	192.7	204.7	227.0	248.1
Arkansas	60.2	62.7	67.1	69.1	71.1	74.2	78.9	85.3	90.1	95.7
California	1,082.1	1,158.8	1,258.7	1,377.0	1,394.9	1,449.5	1,535.2	1,643.9	1,760.5	1,869.0
Colorado	136.3	149.1	162.3	178.3	185.3	189.5	195.7	205.3	222.4	233.1
Connecticut	140.1	147.6	153.8	167.0	172.3	174.9	181.8	198.9	208.2	221.0
Delaware	33.9	36.0	39.1	41.7	43.3	43.0	46.1	50.6	52.9	55.8
District of Columbia	51.7	53.9	58.1	60.5	65.4	69.6	73.8	79.6	84.0	88.5
Florida	403.7	431.4	459.4	490.5	519.0	550.5	585.7	637.1	700.2	748.0
Georgia	242.7	264.2	287.7	304.9	316.4	323.6	335.4	353.0	376.6	393.9
Hawaii	37.9	37.6	39.2	41.2	42.8	45.2	48.6	53.3	58.1	61.7
Idaho	29.7	31.2	34.4	38.4	37.8	39.2	41.1	44.4	48.0	51.8
Illinois	422.7	443.4	465.8	492.9	504.0	514.2	532.0	561.1	588.8	623.5
Indiana	172.9	187.0	195.7	205.8	207.1	214.8	225.9	240.4	247.0	258.5
Iowa	83.7	85.8	88.9	95.0	96.1	100.4	106.9	118.7	124.0	128.3
Kansas	75.2	79.1	82.9	87.4	90.3	93.0	97.7	101.3	106.9	113.7
Kentucky	105.1	109.9	115.9	115.1	119.0	123.9	128.8	136.0	144.2	152.4
Louisiana	118.1	121.5	127.2	134.3	140.3	141.8	157.6	172.6	200.4	207.9
Maine	30.7	32.2	34.4	36.7	38.3	40.0	41.9	44.6	46.1	48.2
Maryland	161.0	171.4	182.0	192.9	206.3	218.5	229.8	247.5	264.7	278.2
Massachusetts	237.4	249.4	264.9	289.6	296.3	303.0	315.3	329.6	344.1	359.3
Michigan	301.8	315.2	338.9	352.0	351.0	365.3	377.5	383.5	396.3	397.3
Minnesota	157.2	167.9	177.0	192.9	198.3	206.1	218.1	231.9	244.8	251.2
Mississippi	58.7	61.2	64.1	66.2	67.7	69.4	74.0	78.2	82.3	87.3
Missouri	163.7	169.8	177.9	187.7	191.8	196.8	205.3	215.9	225.3	234.1
Montana	19.2	20.2	20.8	21.9	23.1	23.9	25.8	28.0	30.4	32.6
Nebraska	50.7	52.5	54.4	57.6	60.2	62.3	67.7	71.3	74.4	78.6
Nevada	59.5	63.9	70.4	75.8	80.1	84.6	90.4	103.4	116.8	125.4
New Hampshire	38.0	40.2	41.2	44.1	45.2	47.5	50.3	53.1	56.1	58.5
New Jersey	308.6	320.9	337.0	360.7	373.2	388.0	404.9	424.0	445.0	466.5
New Mexico	52.5	50.5	53.2	55.6	56.9	58.8	63.6	70.1	74.1	77.5
New York	714.2	739.6	785.3	824.4	864.4	879.6	898.6	954.2	1,024.3	1,083.2
North Carolina	232.8	244.1	263.6	277.0	291.5	301.8	313.9	332.6	357.7	386.4
North Dakota	15.8	16.9	17.0	18.0	19.0	20.3	22.3	23.4	24.7	26.5
Ohio	342.2	360.3	374.6	391.5	396.6	412.0	426.3	450.8	468.2	482.2
Oklahoma	79.5	81.5	85.4	92.1	97.7	99.5	106.1	114.2	125.1	136.8
Oregon	101.0	105.5	108.0	118.1	117.4	122.0	128.0	142.5	147.6	163.0
Pennsylvania	355.6	372.4	389.8	409.5	428.1	440.5	458.4	481.9	505.1	530.0
Rhode Island	28.9	30.5	32.2	34.4	36.1	38.2	40.7	43.5	45.2	47.7
South Carolina	98.4	104.7	111.5	116.8	121.4	126.0	132.5	136.9	144.8	152.8
South Dakota	19.2	20.4	21.5	23.3	24.4	27.3	28.7	30.8	31.6	32.5
Tennessee	154.7	167.2	176.5	182.8	188.5	197.7	206.5	220.5	228.7	239.4
Texas	613.5	653.5	691.4	752.0	787.7	801.2	844.4	922.8	999.6	1,094.1
Utah	57.2	61.5	65.5	70.6	74.2	76.7	80.1	86.5	94.9	106.3
Vermont	15.5	16.1	17.1	18.3	19.2	20.1	21.2	22.5	23.5	24.3
Virginia	218.9	233.9	251.7	269.2	284.6	292.4	309.6	330.4	358.7	378.4
Washington	194.9	211.4	230.7	239.9	240.9	249.9	260.0	271.7	296.7	315.7
West Virginia	38.7	39.8	41.7	42.5	43.7	45.1	46.5	49.4	53.3	56.7
Wisconsin	155.6	164.3	173.8	181.9	188.2	195.5	204.6	216.7	227.0	236.4
Wyoming	14.8	14.9	15.7	17.3	18.8	19.3	21.3	23.7	27.7	33.0
United States	8,608.5	9,089.2	9,660.6	10,284.8	10,621.8	10,977.5	11,510.7	12,274.9	13,093.7	13,855.9

Where shown, R = Revised data.
Source: See first page of this appendix.

Table B2. Current-Dollar Gross Domestic Product by State, 2007-2014

(Billion Dollars)

State	2007	2008	2009	2010	2011	2012	2013	2014
Alabama	170.4	R 173.8	169.4	R 176.3	R 182.2	R 187.5	R 193.4	200.4
Alaska	R 49.3	R 54.7	R 49.6	R 52.5	R 56.8	R 58.5	R 57.1	56.6
Arizona	R 262.2	R 258.9	R 242.9	R 248.1	R 256.5	R 267.2	R 274.3	286.6
Arkansas	R 99.2	R 102.4	R 100.4	R 105.2	R 109.4	R 112.0	R 116.4	120.0
California	R 1,952.0	R 1,997.2	1,915.7	R 1,964.6	R 2,035.3	R 2,124.1	R 2,215.7	2,305.9
Colorado	R 245.2	R 255.4	R 250.0	R 257.8	R 266.4	R 276.0	R 286.8	305.9
Connecticut	R 235.3	R 231.6	R 226.6	R 231.1	R 233.0	R 238.9	R 242.9	250.6
Delaware	R 56.8	R 54.3	56.2	R 57.4	R 59.1	R 59.8	R 60.3	63.4
District of Columbia	R 93.7	R 98.6	R 99.2	104.2	R 108.3	R 110.2	R 111.9	116.4
Florida	R 773.7	R 754.4	R 723.2	R 731.3	R 737.1	R 766.4	R 799.6	838.9
Georgia	R 411.7	R 411.9	R 405.5	R 409.7	R 421.9	R 436.7	R 452.9	474.7
Hawaii	R 64.8	R 66.4	R 65.0	R 67.5	R 69.7	R 72.3	R 74.2	76.2
Idaho	R 55.0	R 56.3	R 54.0	R 55.6	R 57.0	R 58.0	R 60.6	63.2
Illinois	R 648.6	R 646.4	R 641.1	R 653.6	R 679.7	R 709.3	R 715.2	736.3
Indiana	R 271.4	R 274.7	R 262.9	R 282.3	R 290.9	R 298.8	R 307.6	318.1
Iowa	R 137.4	R 136.7	R 136.7	R 141.6	R 149.4	R 159.3	R 164.4	169.7
Kansas	122.3	R 126.0	122.0	R 128.0	R 136.8	R 139.7	R 140.4	144.4
Kentucky	R 155.5	R 158.7	R 155.9	R 165.6	R 172.2	R 177.3	R 181.8	187.8
Louisiana	R 209.7	R 218.3	R 210.6	R 232.7	R 241.0	R 248.8	R 245.0	251.7
Maine	49.3	R 49.9	R 50.3	R 51.3	R 51.6	R 52.7	R 53.2	54.3
Maryland	R 290.1	R 297.6	R 303.1	R 314.1	R 323.2	R 330.6	R 336.4	346.9
Massachusetts	R 378.0	R 384.0	R 381.9	R 398.3	R 413.0	R 429.8	R 437.4	455.7
Michigan	402.4	R 385.2	R 365.2	R 385.8	R 398.8	R 414.1	R 431.7	448.2
Minnesota	R 259.5	R 265.3	R 259.5	R 272.0	R 284.8	R 294.7	R 306.6	317.2
Mississippi	R 91.9	R 94.7	R 92.2	R 95.3	R 97.2	R 101.6	R 102.8	104.8
Missouri	R 241.9	R 249.0	R 250.1	R 256.6	R 257.7	R 265.5	R 272.8	279.8
Montana	35.7	36.6	R 35.3	37.3	40.2	R 41.5	R 42.7	44.1
Nebraska	82.9	85.7	R 87.1	R 91.7	R 99.4	R 102.6	R 107.1	111.0
Nevada	R 131.1	128.8	119.1	R 119.6	R 122.8	R 125.5	128.0	135.0
New Hampshire	60.0	R 59.9	R 60.6	R 62.8	64.2	R 66.4	R 67.5	70.4
New Jersey	R 481.9	R 493.8	484.8	R 494.3	R 498.8	R 522.2	R 534.0	551.8
New Mexico	R 80.4	R 84.0	R 80.9	R 83.7	R 86.5	R 87.7	R 89.1	91.9
New York	R 1,120.9	R 1,108.1	R 1,143.1	R 1,207.6	R 1,230.1	R 1,299.5	R 1,325.4	1,395.5
North Carolina	R 395.7	R 410.1	R 410.0	R 419.5	R 432.8	R 443.7	R 458.3	481.9
North Dakota	28.7	R 32.1	32.0	35.3	R 40.9	R 49.8	R 51.9	56.0
Ohio	R 494.9	R 495.6	R 478.4	R 494.8	R 521.9	R 544.9	R 557.0	576.1
Oklahoma	R 144.2	R 157.3	R 143.4	R 151.8	R 162.2	R 169.6	R 176.1	183.2
Oregon	170.5	R 179.7	R 180.3	R 190.8	R 199.9	R 203.8	R 204.1	212.8
Pennsylvania	553.1	R 565.3	R 565.9	R 585.8	R 604.4	R 621.4	R 636.8	658.3
Rhode Island	R 47.9	R 47.4	47.9	49.3	49.9	R 51.4	R 52.6	54.5
South Carolina	R 160.9	R 162.8	R 161.3	R 165.0	R 171.1	R 175.7	R 181.3	189.3
South Dakota	R 35.0	R 36.9	R 36.4	R 38.2	R 42.5	R 43.3	44.7	46.2
Tennessee	243.4	R 250.4	R 247.3	R 253.2	R 264.0	R 279.6	R 286.9	297.2
Texas	R 1,181.3	R 1,244.6	R 1,171.2	R 1,249.9	R 1,352.1	R 1,449.5	R 1,554.9	1,641.0
Utah	R 116.0	R 116.2	113.9	R 118.2	R 124.6	R 127.8	R 133.9	140.0
Vermont	24.8	25.3	R 25.2	R 26.4	27.6	28.3	R 28.6	29.3
Virginia	R 391.8	R 399.8	R 409.6	R 423.6	R 432.0	R 444.4	R 451.9	462.9
Washington	R 343.3	R 352.9	R 350.9	R 362.2	R 372.5	R 390.7	R 402.5	422.9
West Virginia	58.6	R 62.0	R 63.0	66.2	69.9	R 68.6	R 70.1	74.3
Wisconsin	R 244.0	R 245.1	R 245.6	R 253.9	R 263.3	R 272.6	R 280.7	289.6
Wyoming	R 36.8	43.6	R 37.8	40.2	R 43.2	R 40.8	R 41.6	43.8
United States	14,477.6	14,718.6	14,418.7	14,964.4	15,517.9	R 16,155.3	R 16,663.2	17,348.1

Where shown, R = Revised data.
Source: See first page of this appendix.

Appendix C. Metric and Other Physical Conversion Factors

Data presented in the State Energy Data System (SEDS) are expressed predominately in units that historically have been used in the United States, such as British thermal units, barrels, cubic feet, and short tons.

The metric conversion factors presented in Table C1 can be used to calculate the metric-unit equivalents of values expressed in U.S. customary units. For example, 500 short tons are the equivalent of 453.6 metric tons (500 short tons x 0.9071847 metric tons/short ton = 453.6 metric tons).

In the metric system of weights and measures, the names of multiples and subdivisions of any unit may be derived by combining the name of the unit with prefixes, such as deka, hecto, and kilo, meaning, respectively, 10, 100, 1,000, and deci, centi, and milli, meaning, respectively, one-tenth, one-hundredth, and one-thousandth. Common metric prefixes can be found in Table C2.

The conversion factors presented in Table C3 can be used to calculate equivalents in various physical units commonly used in energy analyses. For example, 10 barrels are the equivalent of 420 U.S. gallons (10 barrels x 42 gallons/barrel = 420 gallons).

APPENDIX C

Table C1. Metric conversion factors

U.S Unit	*multiplied by*	Conversion Factor	*equals*	Metric Unit	U.S. Unit	*multiplied by*	Conversion Factor	*equals*	Metric Unit
Mass					**Volume**				
short tons (2,000 lb)	x	0.9071847	=	metric tons (t)	barrels of oil (b)	x	0.1589873	=	cubic meters (m^3)
long tons	x	1.016047	=	metric tons (t)	cubic yards (yd^3)	x	0.764555	=	cubic meters (m^3)
pounds (lb)	x	0.45359237[a]	=	kilograms (kg)	cubic feet (ft^3)	x	0.02831685	=	cubic meters (m^3)
pounds uranium oxide (lb U_3O_8)	x	0.384647[b]	=	kilograms uranium (kgU)	U.S. gallons (gal)	x	3.785412	=	liters (L)
ounces, avoirdupois (avdp oz)	x	28.34952	=	grams (g)	ounces, fluid (fl oz)	x	29.57353	=	milliliters (mL)
					cubic inches (in^3)	x	16.38706	=	milliliters (mL)
Length					**Area**				
miles (mi)	x	1.609344[a]	=	kilometers (km)	acres	x	0.40469	=	hectares (ha)
yards (yd)	x	0.9144[a]	=	meters (m)	square miles (mi^2)	x	2.589988	=	square kilometers (km^2)
feet (ft)	x	0.3048[a]	=	meters (m)	square yards (yd^2)	x	0.8361274	=	square meters (m^2)
inches (in)	x	2.54[a]	=	centimeters (cm)	square feet (ft^2)	x	0.09290304[a]	=	square meters (m^2)
					square inches (in^2)	x	6.4516[a]	=	square centimeters (cm^2)
Energy					**Temperature**				
British thermal units (Btu)	x	1,055.05585262[a,c]	=	joules (J)	degrees Fahrenheit (˚F)	x	5/9 (after subtracting 32)[a,d]	=	degrees Celsius (˚C)
calories (cal)	x	4.1868[a]	=	joules (J)					
kilowatthours (kWh)	x	3.6[a]	=	megajoules (MJ)					

[a]Exact conversion.

[b]Calculated by the U.S. Energy Information Administration.

[c]The Btu used in this table is the International Table Btu adopted by the Fifth International Conference on Properties of Steam, London, 1956.

[d]To convert degrees Celsius (°C) to degrees Fahrenheit (°F) exactly, multiply by 9/5, then add 32.

Note: Most metric units shown belong to the International System of Units (SI), and the liter, hectare, and metric ton are accepted for use with the SI units.

Sources: General Services Administration, Federal Standard 376B, *Preferred Metric Units for General Use by the Federal Government* (Washington, DC, January 27, 1993), pp. 9–11, 13, and 16. National Institute of Standards and Technology, Special Publications 330, 811, and 814. American National Standards Institute/Institute of Electrical and Electronic Engineers, ANSI/IEEE Std 268–1992, pp. 28 and 29.

Table C2. Metric prefixes

Unit Multiple	Prefix	Symbol	Unit Subdivision	Prefix	Symbol
10^{1}	deka	da	10^{-1}	deci	d
10^{2}	hecto	h	10^{-2}	centi	c
10^{3}	kilo	k	10^{-3}	milli	m
10^{6}	mega	M	10^{-6}	micro	µ
10^{9}	giga	G	10^{-9}	nano	n
10^{12}	tera	T	10^{-12}	pico	p
10^{15}	peta	P	10^{-15}	femto	f
10^{18}	exa	E	10^{-18}	atto	a
10^{21}	zetta	Z	10^{-21}	zepto	z
10^{24}	yotta	Y	10^{-24}	yocto	y

Source: U.S. Department of Commerce, National Institute of Standards and Technology, *The International System of Units (SI)*, NIST Special Publication 330, 1991 Edition (Washington, DC, August 1991), p. 10.

Table C3. Other physical conversion factors

Energy Source	Original Unit		Conversion Factor		Final Unit
Petroleum	barrels (b)	x	42[a]	=	U.S. gallons (gal)
Coal	short tons	x	2,000[a]	=	pounds (lb)
	long tons	x	2,240[a]	=	pounds (lb)
	metric tons (t)	x	1,000[a]	=	kilograms (kg)
Wood	cords (cd)	x	1.25[b]	=	short tons
	cords (cd)	x	128[a]	=	cubic feet (ft^3)

[a]Exact conversion.

[b]Calculated by the U.S. Energy Information Administration.

Source: U.S. Department of Commerce, National Institute of Standards and Technology, *Specifications, Tolerances and Other Technical Requirements for Weighing and Measuring Devices*, NIST Handbook 44, 1994 Edition (Washington, DC, October 1993), pp. B-10, C-17, and C-21.

Appendix D. Data and Methodology Changes

Tables and data files in the State Energy Data System (SEDS) supply a new year of data each production cycle. The latest data may be preliminary and, therefore, revised the following cycle. Changes made to consumption and price source data for historical years are also regularly incorporated into SEDS.

Listed below are changes in SEDS contents beyond the standard updates.

Natural gas

For 2013 forward, missing vehicle fuel price is assigned the state's commercial sector price instead of the average price for selected neighboring states.

Petroleum

Asphalt and road oil

Also beginning in 2009, asphalt physical unit prices are developed by calculating a simple average of the reported weekly or monthly prices from individual state Department of Transportation data. States that do not report prices are assigned their corresponding Census division simple average prices. For states with an incomplete series, the Census division growth rate is applied to available data to estimate missing years.

Glossary

Asphalt: A dark brown-to-black cement-like material obtained by petroleum processing and containing bitumens as the predominant component; used primarily for road construction. It includes crude asphalt as well as the following finished products: cements, fluxes, the asphalt content of emulsions (exclusive of water), and petroleum distillates blended with asphalt to make cutback asphalts.

ASTM: The American Society for Testing and Materials.

Aviation gasoline (finished): A complex mixture of relatively volatile hydrocarbons with or without small quantities of additives, blended to form a fuel suitable for use in aviation reciprocating engines. Fuel specifications are provided in ASTM Specification D 910 and Military Specification MIL-G-5572. *Note:* Data on blending components are not counted in data on finished aviation gasoline.

Aviation gasoline blending components: Naphthas that will be used for blending or compounding into finished aviation gasoline (e.g., straight run gasoline, alkylate, reformate, benzene, toluene, and xylene). Excludes oxygenates (alcohols, ethers), butane, and pentanes plus. Oxygenates are reported as other hydrocarbons, hydrogen, and oxygenates.

Barrel (petroleum): A unit of volume equal to 42 U.S. gallons.

Biomass waste: Organic non-fossil material of biological origin that is a byproduct or a discarded product. "Biomass waste" includes municipal solid waste from biogenic sources, landfill gas, sludge waste, agricultural crop byproducts, straw, and other biomass solids, liquids, and gases; but excludes wood and wood-derived fuels (including black liquor), biofuels feedstock, biodiesel, and fuel ethanol. *Note:* EIA "biomass waste" data also include energy crops grown specifically for energy production, which would not normally constitute waste.

British thermal unit (Btu): The quantity of heat required to raise the temperature of 1 pound of liquid water by 1 degree Fahrenheit at the temperature at which water has its greatest density (approximately 39 degrees Fahrenheit).

Coal: A readily combustible black or brownish-black rock whose composition, including inherent moisture, consists of more than 50% by weight and more than 70% by volume of carbonaceous material. It is formed from plant remains that have been compacted, hardened, chemically altered, and metamorphosed by heat and pressure over geologic time. Coals are classified according to their degree of progressive alteration from lignite to anthracite. In the U.S. classification, the ranks of coal include lignite, subbituminous coal, bituminous coal, and anthracite and are based on fixed carbon, volatile matter, heating value, and agglomerating (or caking) properties.

Coking coal: Bituminous coal suitable for making coke.

Steam coal: In this report, steam coal represents all noncoking coal.

Coal coke: A solid carbonaceous residue derived from low-ash, low-sulfur bituminous coal from which the volatile constituents are driven off by baking in an oven at temperatures as high as 2,000 degrees Fahrenheit so that the fixed carbon and residual ash are fused together. Coke is used as a fuel and as a reducing agent in smelting iron ore in a blast furnace.

Coke plants: Plants where coal is carbonized in slot or beehive ovens for the manufacture of coke.

Combined-heat-and-power (CHP) plant: A plant designed to produce both heat and electricity. If one or more units of the plant is a CHP unit, then the whole plant is designated as a CHP plant. *Note:* This term is being used in place of the term "cogenerator" that was used by EIA in the past. CHP better describes the facilities because some of the plants included do not produce heat and power in a sequential fashion and, as a result, do not meet the legal definition of cogeneration specified in the Public Utility Regulatory Polices Act (PURPA).

Commercial sector: An energy-consuming sector that consists of service-providing facilities and equipment of: businesses; federal, state, and local governments; and other private and public organizations, such as religious, social, or fraternal groups. The commercial sector includes institutional living quarters. It also includes sewage treatment facilities. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a wide variety of other equipment. *Note:* This sector includes generators that produce electricity and/or useful thermal output primarily to support the activities of the above-mentioned commercial establishments.

Conversion factor: A factor for converting data between one unit of

measurement and another (such as between short tons and British thermal units, or between barrels and gallons). (See, http://www.eia.gov/totalenergy/data/monthly/pdf/sec13_1.pdf, http://www.eia.gov/totalenergy/data/monthly/pdf/sec13_a_doc.pdf, and http://www.eia.gov/totalenergy/data/monthly/pdf/sec13_15.pdf for further information on conversion factors.)

Crude oil used directly: Crude oil consumed as fuel by petroleum pipelines and on crude oil leases.

Cubic foot (cf), natural gas: The amount of natural gas contained at standard temperature and pressure (60 degrees Fahrenheit and 14.73 pounds standard per square inch) in a cube whose edges are one foot long.

Current-dollar gross domestic product: A measure of gross domestic product using current price. See **gross domestic product (GDP)**.

Diesel fuel: A fuel composed of distillate fuel oils obtained in petroleum refining operation or blends of such distillate fuel oils with residual fuel oil used in motor vehicles. The boiling point and specific gravity are higher for diesel fuels than for gasoline.

Distillate fuel oil: A general classification for one of the petroleum fractions produced in conventional distillation operations. It includes diesel fuels and fuel oils. Products known as No. 1, No. 2, and No. 4 diesel fuel are used in on-highway diesel engines, such as those in trucks and automobiles, as well as off-highway engines, such as those in railroad locomotives and agricultural machinery. Products known as No. 1, No. 2, and No. 4 fuel oils are used primarily for space heating and electric power generation.

Electrical system energy losses: The amount of energy lost during generation, transmission, and distribution of electricity, including plant and unaccounted-for uses.

Electricity retail sales: The amount of electricity sold by electric utilities and other energy service providers to customers purchasing electricity for their own use and not for resale. These sales are usually grouped by classes of service, such as residential, commercial, industrial, and other. "Other" sales include sales for public street and highway lighting and other sales to public authorities and railways, and interdepartmental sales.

Electric power sector: An energy-consuming sector that consists of electricity only and combined heat and power (CHP) plants whose primary business is to sell electricity, or electricity and heat, to the public—i.e., North American Industry Classification System 22 plants. See also **combined heat and power (CHP) plant**.

Electric utility: A corporation, person, agency, authority, or other legal entity or instrumentality aligned with distribution facilities for delivery of electric energy for use primarily by the public. Included are investor-owned electric utilities, municipal and state utilities, federal electric utilities, and rural electric cooperatives. A few entities that are tariff based and corporately aligned with companies that own distribution facilities are also included.

End-use sectors: The residential, commercial, industrial, and transportation sectors of the economy.

Energy: The capacity for doing work as measured by the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy). Energy has several forms, some of which are easily convertible and can be changed to another form useful for work. Most of the world's convertible energy comes from fossil fuels that are burned to produce heat that is then used as a transfer medium to mechanical or other means in order to accomplish tasks. Electrical energy is usually measured in kilowatthours, while heat energy is usually measured in British thermal units.

Energy consumption: The use of energy as a source of heat or power or as an input in the manufacturing process.

Energy expenditures: The money directly spent by consumers to purchase energy. Expenditures equal the amount of energy used by the consumer multiplied by the price per unit paid by the consumer. *Note:* In the calculation of the amount of energy used, process fuel and intermediate products are not included.

Energy-consuming sectors: See **energy-use sectors**.

Energy-use sectors: A group of major energy-consuming components of U.S. society developed to measure and analyze energy use. The sectors most commonly referred to in EIA are: residential, commercial, industrial, transportation, and electric power.

Ethanol (C_2H_5OH): A clear, colorless, flammable alcohol. Ethanol is typically produced biologically from biomass feedstocks such as agricultural crops and cellulosic residues from agricultural crops or wood. Ethanol can also be produced chemically from ethylene. See **fuel ethanol.**

Exports: Shipments of goods from within the 50 states and the District of Columbia to U.S. possessions and territories or to foreign countries.

f.a.s.: See **free alongside ship**.

Federal Energy Regulatory Commission (FERC): The federal agency with jurisdiction over interstate electricity sales, wholesale electric rates, hydroelectric licensing, natural gas pricing, oil pipeline rates, and gas pipeline certification. FERC is an independent regulatory agency within the Department

of Energy and is the successor to the Federal Power Commission.

Federal Power Commission (FPC): The predecessor agency of the Federal Energy Regulatory Commission. The Federal Power Commission was created by an Act of Congress under the Federal Water Power Act on June 10, 1920. It was charged originally with regulating the electric power and natural gas industries. It was abolished on September 30, 1977, when the Department of Energy was created. Its functions were divided between the Department of Energy and the Federal Energy Regulatory Commission, an independent regulatory agency.

Fiscal year: The U.S. Government's fiscal year runs from October 1 through September 30. The fiscal year is designated by the calendar year in which it ends; e.g., fiscal year 2002 begins on October 1, 2001, and ends on September 30, 2002.

Fossil fuel: An energy source formed in the Earth's crust from decayed organic material, such as petroleum, coal, and natural gas.

Free alongside ship (f.a.s.): The value of a commodity at the port of exportation, generally including the purchase price, plus all charges incurred in placing the commodity alongside the carrier at the port of exportation.

Fuel ethanol: Ethanol intended for fuel use. Fuel ethanol in the United States must be anhydrous (less than 1% water). Fuel ethanol is denatured (made unfit for human consumption), usually prior to transport from the ethanol production facility, by adding 2 to 5 volume percent petroleum, typically pentanes plus or conventional motor gasoline. Fuel ethanol is used principally for blending in low concentrations with motor gasoline as an oxygenate or octane enhancer. In high concentrations, it is used to fuel alternative-fuel vehicles specially designed for its use.

Gasohol: A blend of finished motor gasoline containing alcohol (generally fuel ethanol but sometimes methanol) at a concentration between 5.7% and 10% by volume.

Geothermal energy: Hot water or steam extracted from geothermal reservoirs in the Earth's crust and used for geothermal heat pumps, water heating, or electricity generation.

Gross domestic product (GDP): The total value of goods and services produced by labor and property located in the United States. As long as the labor and property are located in the United States, the supplier (that is, the workers and, for property, the owners) may be either U.S. residents or residents of foreign countries.

Heat content: The amount of heat energy available to be released by the transformation or use of a specified physical unit of an energy form (e.g., a ton of coal, a barrel of oil, a kilowatthour of electricity, a cubic foot of natural gas, or a pound of steam). The amount of heat energy is commonly expressed in British thermal units (Btu). *Note:* Heat content of combustible energy forms can be expressed in terms of either gross heat content (higher or upper heating value) or net heat content (lower heating value), depending upon whether or not the available heat energy includes or excludes the energy used to vaporize water (contained in the original energy form or created during the combustion process). The Energy Information Administration typically uses gross heat content values.

Heating degree-days (HDD): A measure of how cold a location is over a period of time relative to a base temperature, most commonly specified as 65 degrees Fahrenheit. The measure is computed for each day by subtracting the average of the day's high and low temperatures from the base temperature (65 degrees), with negative values set equal to zero. Each day's heating degree-days are summed to create a heating degree-day measure for a specified reference period. Heating degree-days are used in energy analysis as an indicator of space heating energy requirements or use.

Hydroelectric power: The production of electricity from the kinetic energy of falling water.

Imports: Receipts of goods into the 50 states and the District of Columbia from U.S. possessions and territories or from foreign countries.

Independent power producer: A corporation, person, agency, authority, or other legal entity or instrumentality that owns or operates facilities for the generation of electricity for use primarily by the public, and that is not an electric utility. *Note:* Independent power producers are included in the electric power sector.

Industrial sector: An energy-consuming sector that consists of all facilities and equipment used for producing, processing, or assembling goods. The industrial sector encompasses the following types of activity: manufacturing (NAICS codes 31-33); agriculture, forestry, fishing and hunting (NAICS code 11); mining, including oil and gas extraction. (NAICS code 21); and construction (NAICS code 23). Overall energy use in this sector is largely for process heat and cooling and powering machinery, with lesser amounts used for facility heating, air conditioning, and lighting. Fossil fuels are also used as raw material inputs to manufactured products. *Note:* This sector includes generators that produce electricity and/or useful thermal output primarily to support the above-mentioned industrial activities.

Jet fuel: A refined petroleum product used in jet aircraft engines. Kerosene-type jet fuel is a kerosene-based product used for commercial and military

turbojet and turboprop aircraft engines. Naphtha-type jet fuel is a fuel in the heavy naphtha boiling range used primarily for military turbo-jet and turboprop aircraft engines because it has a lower freeze point than other aviation fuels and meets engine requirements at high altitudes and speeds.

Kerosene: A light petroleum distillate that is used in space heaters, cook stoves, and water heaters and is suitable for use as a light source when burned in wick-fed lamps. Kerosene has a maximum distillation temperature of 400 degrees Fahrenheit at the 10% recovery point, a final boiling point of 572 degrees Fahrenheit, and a minimum flash point of 100 degrees Fahrenheit. Included are No. 1-K and No. 2-K, the two grades recognized by ASTM Specification D 3699 as well as all other grades of kerosene called range or stove oil, which have properties similar to those of No. 1 fuel oil.

Kilowatthour (kWh): A measure of electricity defined as a unit of work or energy, measured as 1 kilowatt (1,000 watts) of power expended for 1 hour. One kilowatthour is equivalent to 3,412 Btu.

Lease and plant fuel: Natural gas used in well, field, and lease operations (such as gas used in drilling operations, heaters, dehydrators, and field compressors) and used as fuel in natural gas processing plants.

Liquefied petroleum gases (LPG): A group of hydrocarbon gases, primarily propane, normal butane, and isobutane, derived from crude oil refining or natural gas processing. These gases may be marketed individually or mixed. They can be liquified through pressurization (without requiring cryogenic refrigeration) for convenience of transportation or storage. Excludes ethane and olefins. *Note:* In some EIA publications, LPG includes ethane and marketed refinery olefin streams, in accordance with definitions used prior to January 2014.

Lubricants: Substances used to reduce friction between bearing surfaces, or incorporated into other materials used as processing aids in the manufacture of other products, or used as carriers of other materials. Petroleum lubricants may be produced either from distillates or residues. Lubricants include all grades of lubricating oils, from spindle oil to cylinder oil to those used in greases.

Miscellaneous petroleum products: All finished petroleum products not classified elsewhere—for example, petrolatum, lube refining byproducts (aromatic extracts and tars), absorption oils, ram-jet fuel, petroleum rocket fuels, synthetic natural gas feedstocks, and specialty oils.

Motor gasoline (finished): A complex mixture of relatively volatile hydrocarbons with or without small quantities of additives, blended to form a fuel suitable for use in spark-ignition engines. Motor gasoline, as defined in ASTM Specification D-4814 or Federal Specification VV-G-1690C, is characterized as having a boiling range of 122 to 158 degrees Fahrenheit at the 10% recovery point to 365 to 374 degrees Fahrenheit at the 90% recovery point. "Motor Gasoline" includes conventional gasoline; all types of oxygenated gasoline, including gasohol; and reformulated gasoline, but excludes aviation gasoline. *Note:* Volumetric data on blending components, such as oxygenates, are not counted in data on finished motor gasoline until the blending components are blended into the gasoline.

Motor gasoline blending components: Naphthas (e.g., straight-run gasoline, alkylate, reformate, benzene, toluene, xylene) used for blending or compounding into finished motor gasoline. These components include reformulated gasoline blendstock for oxygenate blending (RBOB) but exclude oxygenates (alcohols, ethers), butane, and pentanes plus. *Note:* Oxygenates are reported as individual components and are included in the total for other hydrocarbons, hydrogens, and oxygenates.

Natural gas: A gaseous mixture of hydrocarbon compounds, the primary one being methane.

Natural gas, dry: Natural gas which remains after: 1) the liquefiable hydrocarbon portion has been removed from the gas stream (i.e., gas after lease, field, and/or plant separation); and 2) any volumes of nonhydrocarbon gases have been removed where they occur in sufficient quantity to render the gas unmarketable. Dry natural gas is also known as consumer-grade natural gas. The parameters for measurement are cubic feet at 60 degrees Fahrenheit and 14.73 pounds per square inch absolute.

Natural gasoline: A term used in the gas processing industry to refer to a mixture of liquid hydrocarbons (mostly pentanes and heavier hydrocarbons) extracted from natural gas. It includes isopentane.

Nominal dollars: A measure used to express nominal price.

Nominal price: The price paid for a product or service at the time of the transaction. Nominal prices are those that have not been adjusted to remove the effect of changes in the purchasing power of the dollar; they reflect buying power in the year in which the transaction occurred.

Non-biomass waste: Material of non-biological origin that is a byproduct or a discarded product. "Non-biomass waste" includes municipal solid waste from non-biogenic sources, such as plastics, and tire-derived fuels.

Nonutility power producer: A corporation, person, agency, authority, or other legal entity or instrumentality that owns or operates facilities for electric generation and is not an electric utility. Nonutility power producers include qualifying cogenerators, qualifying small power producers, and other

nonutility generators (including independent power producers). Nonutility power producers are without a designated franchised service area and do not file forms listed in the *Code of Federal Regulations*, Title 18, Part 141.

North American Industry Classification System (NAICS): A classification scheme, developed by the Office of Management and Budget to replace the Standard Industrial Classification (SIC) System, that categorizes establishments according to the types of production processes they primarily use.

Nuclear electric power (nuclear power): Electricity generated by the use of the thermal energy released from the fission of nuclear fuel in a reactor.

Nuclear fuel: Fissionable materials that have been enriched to a composition that, when placed in a nuclear reactor, will support a self-sustaining fission chain reaction, producing heat in a controlled manner for process use.

PAD Districts or PADD: Petroleum Administration for Defense Districts. A geographic aggregation of the 50 states and the District of Columbia into five Districts, with PADD 1 further split into three subdistricts. The PADDs include the states listed below:

- PADD 1 (East Coast):
  - PADD 1A (New England): Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.
  - PADD 1B (Central Atlantic): Delaware, District of Columbia, Maryland, New Jersey, New York, and Pennsylvania.
  - PADD 1C (Lower Atlantic): Florida, Georgia, North Carolina, South Carolina, Virginia, and West Virginia.
- PADD 2 (Midwest): Illinois, Indiana, Iowa, Kansas, Kentucky, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, Tennessee, and Wisconsin.
- PADD 3 (Gulf Coast): Alabama, Arkansas, Louisiana, Mississippi, New Mexico, and Texas.
- PADD 4 (Rocky Mountain): Colorado, Idaho, Montana, Utah, and Wyoming.
- PADD 5 (West Coast): Alaska, Arizona, California, Hawaii, Nevada, Oregon, and Washington.

Pentanes plus: A mixture of hydrocarbons, mostly pentanes and heavier, extracted from natural gas. Includes isopentane, natural gasoline, and plant condensate.

Petrochemical feedstocks: Chemical feedstocks derived from petroleum principally for the manufacture of chemicals, synthetic rubber, and a variety of plastics. In this report the categories reported are "Naphtha Less Than 401°F" and "Other Oils Equal to or Greater Than 401°F."

Petroleum: A broadly defined class of liquid hydrocarbon mixtures. Included are crude oil, lease condensate, unfinished oils, refined products obtained from the processing of crude oil, and natural gas plant liquids. *Note:* Volumes of finished petroleum products include nonhydrocarbon compounds, such as additives and detergents, after they have been blended into the products.

Petroleum coke: A residue high in carbon content and low in hydrogen that is the final product of thermal decomposition in the condensation process in cracking. This product is reported as marketable coke or catalyst coke. The conversion is 5 barrels (of 42 U.S. gallons each) per short ton.

Petroleum coke, catalyst: The carbonaceous residue that is deposited on and deactivates the catalyst used in many catalytic operations (e.g., catalytic cracking). Carbon is deposited on the catalyst, thus deactivating the catalyst. The catalyst is reactivated by burning off the carbon, which is used as a fuel in the refining process. That carbon or coke is not recoverable in a concentrated form.

Petroleum coke, marketable: Those grades of coke produced in delayed or fluid cokers that may be recovered as relatively pure carbon. Marketable petroleum coke may be sold as is or may be further purified by calcining.

Petroleum products: Products obtained from the processing of crude oil (including lease condensate), natural gas, and other hydrocarbon compounds. Petroleum products include unfinished oils, liquefied petroleum gases, pentanes plus, aviation gasoline, motor gasoline, naphtha-type jet fuel, kerosene-type jet fuel, kerosene, distillate fuel oil, residual fuel oil, petrochemical feedstocks, special naphthas, lubricants, waxes, petroleum coke, asphalt, road oil, still gas, and miscellaneous products.

Photovoltaic energy: Direct-current electricity generated from photovoltaic cells. See **photovoltaic cells (PVC)**.

Photovoltaic cells (PVC): An electronic device consisting of layers of semiconductor materials fabricated to form a junction (adjacent layers of materials with different electronic characteristics) and electrical contacts and being capable of converting incident light directly into electricity (direct current).

Plant condensate: Liquid hydrocarbons recovered at inlet separators or scrubbers in natural gas processing plants at atmospheric pressure and ambient temperatures. Mostly pentanes and heavier hydrocarbons.

Primary energy expenditures: Expenditures for energy consumed in each of

the four major end-use sectors, excluding energy in the form of electricity, plus expenditures by the electric power sector for energy used to generate electricity. There are no fuel-associated expenditures for associated expenditures for hydroelectric power, geothermal energy, photovoltaic and solar energy, or wind energy. Also excluded are the quantifiable consumption expenditures that are an integral part of process fuel consumption.

Process fuel: All energy consumed in the acquisition, processing, and transportation of energy. Quantifiable process fuel includes three categories: natural gas lease and plant operations, natural gas pipeline operations, and oil refinery operations.

Propane (C_3H_8): A straight-chain saturated (paraffinic) hydrocarbon extracted from natural gas or refinery gas streams, which is gaseous at standard temperature and pressure. It is a colorless gas that boils at a temperature of -44 degrees Fahrenheit. It includes all products designated in ASTM Specification D1835 and Gas Processors Association specifications for commercial (HD-5) propane.

Refinery (petroleum): An installation that manufactures finished petroleum products from crude oil, unfinished oils, natural gas liquids, other hydrocarbons, and alcohol.

Renewable energy: Energy resources that are naturally replenishing but flow-limited. They are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time. In this report, renewable sources of energy include biomass, hydroelectric power, geothermal, solar, and wind.

Residential sector: An energy-consuming sector that consists of living quarters for private households. Common uses of energy associated with this sector include space heating, water heating, air conditioning, lighting, refrigeration, cooking, and running a variety of other appliances. The residential sector excludes institutional living quarters.

Residual fuel oil: A general classification for the heavier oils, known as No. 5 and No. 6 fuel oils, that remain after the distillate fuel oils and lighter hydrocarbons are distilled away in refinery operations. It conforms to ASTM Specifications D 396 and D 975 and Federal Specification VV-F-815C. No. 5, a residual fuel oil of medium viscosity, is also known as Navy Special and is defined in Military Specification MIL-F-859E, including Amendment 2 (NATO Symbol F-770). It is used in steam-powered vessels in government service and inshore powerplants. No. 6 fuel oil includes Bunker C fuel oil and is used for the production of electric power, space heating, vessel bunkering, and various industrial purposes.

Road oil: Any heavy petroleum oil, including residual asphaltic oil, used as a dust palliative and surface treatment on roads and highways. It is generally produced in six grades, from 0, the most liquid, to 5, the most viscous.

Short ton (coal): A unit of weight equal to 2,000 pounds.

Solar energy: The radiant energy of the sun that can be converted into other forms of energy, such as heat or electricity.

Special naphthas: All finished products within the naphtha boiling range that are used as paint thinners, cleaners, or solvents. Those products are refined to a specified flash point. Special naphthas include all commercial hexane and cleaning solvents conforming to ASTM Specifications D1836 and D484, respectively. Naphthas to be blended or marketed as motor gasoline or aviation gasoline or that are to be used as petrochemical and synthetic natural gas (SNG) feedstocks are excluded.

Standard Industrial Classification (SIC): Replaced with North American Industry Classification System. See **NAICS.**

Steam coal: See **coal**.

Still gas: Any form or mixture of gases produced in refineries by distillation, cracking, reforming, and other processes. The principal constituents are methane and ethane. May contain hydrogen and small/trace amounts of other gases. Still gas is typically consumed as refinery fuel or used as petrochemical feedstock. Still gas burned for refinery fuel may differ in composition from marketed still gas sold to other users.

Transportation sector: An energy-consuming sector that consists of all vehicles whose primary purpose is transporting people and/or goods from one physical location to another. Included are automobiles; trucks; buses; motorcycles; trains, subways, and other rail vehicles; aircraft; and ships, barges, and other waterborne vehicles. Vehicles whose primary purpose is not transportation (e.g., construction cranes and bulldozers, farming vehicles, and warehouse tractors and forklifts) are classified in the sector of their primary use. In this report, natural gas used in the operation of natural gas pipelines is included in the transportation sector.

Unfinished oils: All oils requiring further processing, except those requiring only mechanical blending. Unfinished oils are produced by partial refining of crude oil and include naphthas and lighter oils, kerosene and light gas oils, heavy gas oils, and residuum.

Unfractionated streams: Mixtures of unsegregated natural gas liquid components, excluding those in plant condensate. This product is extracted from natural gas.

United States: The 50 states and the District of Columbia. Note: The United

States has varying degrees of jurisdiction over a number of territories and other political entities outside the 50 states and the District of Columbia, including Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, Johnston Atoll, Midway Islands, Wake Island, and the Northern Mariana Islands. EIA data programs may include data from some or all of these areas in U.S. totals. For these programs, data products will contain notes explaining the extent of geographic coverage included under the term "United States."

Value added by manufacture: A measure of manufacturing activity that is derived by subtracting the cost of materials (which covers materials, supplies, containers, fuel, purchased electricity, and contract work) from the value of shipments. This difference is then adjusted by the net change in finished goods and work-in-progress between the beginning- and end-of-year inventories.

Vessel bunkering: Includes sales for the fueling of commercial or private boats, such as pleasure craft, fishing boats, tugboats, and ocean-going vessels, including vessels operated by oil companies. Excluded are volumes sold to the U.S. Armed Forces.

Waste energy: Municipal solid waste, landfill gas, methane, digester gas, liquid acetonitrile waste, tall oil, waste alcohol, medical waste, paper pellets, sludge waste, solid byproducts, tires, agricultural byproducts, closed loop biomass, fish oil, and straw used as fuel. See **biomass waste** and **non-biomass waste**.

Wax: A solid or semi-solid material consisting of a mixture of hydrocarbons obtained or derived from petroleum fractions, or through a Fischer-Tropsch type process, in which the straight-chained paraffin series predominates. This includes all marketable wax, whether crude or refined, with a congealing point (ASTM D 938) between 100 and 200 degrees Fahrenheit and a maximum oil content (ASTM D 3235) of 50 weight percent.

Wind energy: Kinetic energy present in wind motion that can be converted to mechanical energy for driving pumps, mills, and electric power generators.

Wood energy: Wood and wood products used as fuel, including round wood (cord wood), limb wood, wood chips, bark, sawdust, forest residues, charcoal, pulp waste, and spent pulping liquor.